THE INTERNATIONAL JOURNAL of ORGANIZATIONAL INNOVATION

VOLUME 6 NUMBER 2, OCTOBER 2013

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Information Regarding:

The International Journal of Organizational Innovation (IJOI),
The 2014 International Conference on Organizational Innovation, and
The International Association of Organizational Innovation (IAOI).

The International Journal of Organizational Innovation (IJOI) (ISSN 1943-1813) is an international, blind peer-reviewed journal, published quarterly. It may be viewed online for free. (There are no print versions of this journal; however, the journal .pdf file may be downloaded and printed.) 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. All past issues of the journal are available on the journal website. Submissions are welcome from the members of IAOI and other associations & all other scholars and practitioners. Student papers are also welcome.

For information regarding submissions to the journal, go to the journal homepage: http://www.ijoi-online.org/   To Contact the IJOI Editor, email: drfdembowski@aol.com

Note: the format for this Journal has changed with the January, 2013 issue. The journal is now published in a two-column format (instead of the single column format used in prior issues). Please see the new author guidelines on the Journal's website, as well as a sample article showing how they will appear in the new format.

NEWS REGARDING the INTERNATIONAL ASSOCIATION OF ORGANIZATIONAL INNOVATION

The International Association of Organizational Innovation (IAOI) has entered into a strategic partnership with *Academic Partnerships (AP). The* most rapidly developing trend in higher education is a transition to the online delivery of instruction by universities around the world. Academic Partnerships serves almost 40 institutions in USA, making AP the largest representative of public universities' online learning in the United States. One immediate benefit of this partnership between IAOI and AP is free access to Faculty eCommons, an online service provided by AP designed to help faculty keep up with the latest techniques in online course development and delivery, as well providing information regarding with professional development activities to aid faculty in developing and delivering online courses. Please visit their website to get started in these activities: http://facultyecommons.org/

There have been some personnel changes in the Association.

Dr. Kenneth Lane has completed his term of service as Vice President of IAOI. We thank him for his five years of service to our Organization.

Dr. Alex Maritz, Australian Grad. School of Entrepreneurship, Australia, has been named as Vice President of IAOI. His primary responsibilities will be to assist with the annual conference and the Association webpage development.

For more information on the International Association of Organizational Innovation, go to: http://www.iaoiusa.org

The International Conference on Organizational Innovation (ICOI)

The 2014 ICOI Conference will be held in Manila, Philippines at De La Salle University, August 13-15, 2014. Complete details will be available soon.

The 2015 ICOI conference location is Jogia/Jogjakarta, Indonesia. Jogja is a famous tourist destination after Bali. For more information, please visit http://www.yogyes.com/ the Airlangga University will be the Host

International Journal of Organizational Innovation

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RESILIENT LEADERS:
ESSENTIAL FOR ORGANIZATIONAL INNOVATION

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Abstract

The digital information explosion coupled with advances in technology and societal expectations are placing pressure on organizations, particularly higher education institutions, to adapt to a new and changing environment. As the modern world changes, higher education is also shifting dramatically from a stable institution for more than 500 years to a dynamic entity that requires new leadership to meet the expectations for innovation and change. Such innovation and change is not easy and demands the best leaders to create organizational innovation driven by those willing and able to lead. Resilient leaders are the different class of organizational leaders motivated by higher education institutions acceptable to innovation.

Key Words: Leader, Leadership, Resilient, Resilience, Higher Education, Global, Organizational Change and Organizational Innovation

Introduction

"As we look ahead, we need to strive for an environment, and a civilization, able to handle unexpected changes without threatening to collapse.

Such a world would be more than simply sustainable; it would be regenerative and diverse, relying on the capacity not only to absorb shocks like the popped housing bubble or rising sea levels, but to evolve with them. In a word, it would be resilient." Jamais Cascio

The modern world is changing quickly in many unanticipated ways (Blackmore, 2007). Stability has given way to innovation, creativity, and diversity in the contemporary world (Richardson, 2002; Robb, 2000). Progressively frenzied environments mandate that higher education institutions become more resilient (Grotberg, 2003; Woods, 2006). What is the likelihood of sustaining the model of higher education which has flourished for over 500 years in changing environments, mandates and challenges (Uhl-Bien, Marion & McKelvery, 2007; Weick & Sutcliffe, 2001)?

Both academics and practitioners recently uncovered resilience as a widely viewed potential solution to the challenges posed by change and innovation (Bullen, Morgan, Belfer & Oayyam, 2009; Matzenberger, 2013). In today's world, resilient leaders look for ways to manage in an imbalanced world where the focus is on leading for resilience, where the future is unpredictable (Blin & Munro, 2008; Heifetz, Grashow & Linsky, 2009), capacity is uncertain and unknown (Lee, McCann & Selsky, 2009), and learning is an issue of social and economic security (Carmeli, Fredman & Tishler, 2013; Pike, Dawley & Tomaney, 2010). While the concept of resilience is progressively more popular, empirical research on resilient organizations is actually quite rare (Lane, Kehr & Richardson, 2009; Shaw, 2012; Walker & Cooper, 2010). In this article the authors explore the relationships among organizational characteristics, organizational processes and resilience, particularly the role of resilient leaders in modern organizations.

What is Resilience?

The word 'resilience' was derived from the Latin resilio (resilı´re), which meant ''to jump back'' (Batabyal, 1998;

Kaplan, 1999). First used in physics and mathematics, resilience described how materials resumed their shape after movement or alternation (Jones & Asensio, 2001; Luthar, 2003). Due to the use of certain other terms, sustainability and adaptability for example, resilience has become a significant topic of study in both science and social science (Aguirre, 2006; Daft, 2007; Hamel & Valikangas, 2003; Milstein & Henry, 2000). C. S. Holling (1973) first introduced resilience as a term to describe the ability of systems to absorb disturbance and maintain stability. Resilience, as a framework for understanding educational change and response, has been gaining an audience in higher education (Farmer, 2010; Zellars, Justice & Beck, 2011). Policymakers worldwide have examined the ramifications of resilience on higher education planning and development (Cranston, Ehrich & Kimber, 2006; Wang, Haertel & Walherg, 1995).

Higher education leaders are faced with the reality of resilience: the need to embrace change and still remain viable (Olssen, 2005). In higher education resilience has two separate constructs: the capacity to absorb and withstand disruption in addition to the capacity to adapt, modify and change when demanded (Garcia, 2006; Farmer, 2010; Walker, Holling, Carpenter & Kinzig, 2004). The perceived vulnerability of universities to outside threats has forced many university leaders to critically examine their mission in the face of monumental change (Graham, Luke & Luke, 2007; Rochford, 2006; Warner & Pyle, 1997).

Resilience goes beyond specific responses and implies the existence of organizational resources and capacities that can be actuated when adverse conditions arise (Vogus & Sutcliffe, 2007). At a basic level, resilience embodies the concept of helping organizational leaders manage the current crisis and build ca-

pacity for dealing with future disturbances (Boin & McConnell, 2007; Gunderson, 2000). Resilience confirms that universities are in a state of constant change with more robust, complex, interconnected systems that demand organizational resilience (Bates, 2010; Giroux, 2005; Waxman, Padron & Gray, 2004).

What Is Meant by Organizational Resilience?

Organizational resiliency is an organizational concept intended to improve decision-making by encouraging the diversification of capacities in the organization to be responsive to uncertain future events (Bernard, 2004; Suddaby, 2010; Wolfe, 1994). Researchers speculate that organizational resilience helps leaders determine how the university can thrive in multifaceted settings with unpredictable change (Lauder, Brown, Dillabough & Halsey, 2006). This change has created an apprehensive culture among the members of many universities that demands action from organizational leaders (Gough & Scott, 2007). Therefore, organizational leaders must prepare strategies, operations and governance structures that will mitigate the disruption and guarantee the survivability of their organizations (de Sousa, Pellissier & Monteiro, 2012; Linnenluecke & Griffiths, 2010). Organizational leaders must develop the capacity of those in the organization to adapt to change (Burnard & Bhamra, 2011; Lengnick-Hall, Beck & Lengnick-Hall, 2011). Organizational resilience highlights the capacity of an organization to 'absorb' adversity in order to continue organizational functioning and 'bounce back' (Allison & Reeves, 2011).

Some universities are so dramatically impacted by change and innovation that they must make significant alterations or innovations to survive (Brown, 2008; Laredo, 2007; Christensen, Horn &

Johnson, 2008). The universities that survive must develop routines, procedures, and processes that will formalize the organizational structure during the turbulent change and develop resilience capacity (Marshall, 2007; Moran & Tame, 2012). The organizational leader cannot determine organizational resilience by individual organization members since the university is more than the sum of its parts (Denning, 2005; Scott, Coates & Anderson, 2008). Consequently, an organization's resilience cannot be measured by its members but by the ability of the total organization (Berkes, Colding & Folke, 2003; Dietz & Bozeman, 2005). Organizational resilience validates the university's ability to learn, become more complex, and accomplish its goals within changing conditions (Boin & van Eeten, 2013; Horne & Orr, 1998; Meadows, 2008). With massive transformation inevitable, organizational resilience creates the mechanisms required for revitalization, reorganization and innovation (Comfort, Sungu, Johnson & Dunn, 2001; Teichler, 2006; Wooldridge, 2011).

Resilient organizations encourage innovation and foster a culture of continuous innovation to solve problems and adapt to challenges (Kantur & Iseri-Say, 2012). Organizational resilience is therefore an important criterion for any organization facing risk, particularly higher education (McDonald, 2006; Uden, 2005). Building higher education systems that not only survive but thrive is critical to the long-term development of the world (Blackmore, 2007; Morris, 2011). Organizational resilience describes higher education systems that are adaptable to shock, willing and able to modify and adapt and move forward, not backward (Guri-Rosenblit, Sebkova & Teichler, 2007; Smith & Fischbacher, 2009).

What Is Innovation?

Innovation, by definition, means the first introduction of new idea, product, process, or system (Carlile, 2004; Smith, 2010). Innovation is critical in achieving competitive advantage in today's higher education environment (McManus, Seville, Vargo & Brunsdon, 2007). Innovation implies that the university must satisfy its clients, politicians, and stakeholders (Matzenberger, 2013). In higher education, innovation focuses on knowledge creation and development which will justify its continued existence, particularly when financed by governments (Luke, 2005; Mork, Aanestad, Hanseth & Grisot, 2008). Innovative organizational leaders reduce uncertainty and complexity while concurrently achieving mission completion (Henry & Milstein, 2006). Innovation permits the organization to achieve increased productivity (Adams, 2006) and better match the needs of its clients by matching its organization fit to its environment (Schneckenberg, 2009).

Innovation and change are often used interchangeably (Basadur & Gelade, 2006). However, change implies an ending and that it can be managed (Milliken & Colohan, 2004). In a world of volatility, these concepts are not practicable (Meyer, Gaba & Colwell, 2005). Most universities have rigid organizational structures with centralized command and control that are linear and unidirectional (Birkinshaw, Hamel & Mol, 2004). In addition, they employ demanding measurement to limit variation and drive efficiency, the antithesis of the new models for change and innovation (de Souisa, Pellissier & Montterio, 2012). Conversely, innovation is knowledge used in a distinctive and altered manner (McDormott & Sexton, 2005). Innovation takes place in leadership, culture, and products (de Souisa, Pellissier & Montterio, 2012). Creating space for innovation is complex and derived from

leaders who embrace change (Rozychi, 2004).

Innovation is effected by people and their desire to increase and benefit from change (Walker & Cooper, 2010). A resilient leader of innovation needs to follow a rapid innovation strategy because organizational innovation is critical to the productivity, adaptability, and existence of educational organizations (Bhamra, Dani & Burnard, 2011). Leaders are often overwhelmed by volume and rapidity of change (Plowman, Solansky, Beck, Baker, Kulkarni & Travis, 2007). The tremendous amount of available information coupled with the increased speed of change is surpassing the ability of most educational organizations to adapt (Mok, 2005; Rossiter, 2007).

Building Resilience

Building resilience into higher education institutions is an effective way to cope with change characterized by shock and indefinite hazards (Zaccaro, Weiss, Hilton & Jeffries, 2011). Folke, Carpenter, Walker, Scheffer, Chapin, and Rockstrom (2010) identified four critical factors that are crucial to building resilience in higher education: (1) learning to live with uncertainty and ambiguity by developing strategies to cope with rapid change, (2) nurturing various types of social and political diversity for reducing threats, (3) increasing knowledge for learning and problem-solving, and (4) creating and developing circumstances for reorganization.

Resilience assists the organizational leader to: (1) totally evaluate the organization (McMahon, 2006), (2) accentuate the capability of the organization to absorb disturbance and adapt (Gallopin, 2006), and (3) create an environment for dealing with ambiguity, change and uncertainty (Gibson & Tarrant, 2010).

Resilient Leadership

Resilient leaders are charged to keep the organization on a steady focus in the face of external disturbance and stress (Allison, 2012). Increasing the amount of external force and changing the system in the short term might create practices and policies that will reduce resistance in the future (Sheffi, 2007). In the 1990s this was witnessed in many of the educational reforms and demands for change (Morales & Trotman, 2004). Resilient leadership is characterized by leaders who demonstrate three critical skills. First, they realize that they must create an environment where stakeholders learn from each new event (Sutccliffe & Vogus, 2003). Second, they understand that the organization needs more than movement toward a target based on forecasts alone (Evans, 2010). Third, resilient leaders are charged with preserving the elements of the organization that will permit the organization to renew and reorganize itself following change, thereby increasing the resiliency of the organization (O'Malley, 2010; Temponi, 2005).

This adaptive capacity resides in the human capabilities of the organization that must provide creativity, innovation, flexibility and diversity to the renewal process (Pike, Dawley & Tomaney 2010; Zellars, Justice & Beck, 2011). Adaptive capacity reflects learning, flexibility to experiment and adopt novel solutions, and development of generalized responses to both internal and external challenges (Deiaco, Hughes & McKelvey, 2012; Glavoic, 2005). Ultimately, resilience emphasizes increasing the organization's ability to withstand crises (Danielson, 2011). Resilient leaders are able to overcome the unexpected because they perceive sustainability as survival and resilience as thriving amid chaos (Drew, Ehrich & Hansford, 2008; McCellan & Christman, 2008). Resilient

leaders sustain the moment, but they hold the key for the future (Walker & Salt, 2006).

What Are the Skills of Resilient Leaders?

Instead of being routine and predictable, higher education has grown increasingly unstable, unpredictable, and unbalanced in the current era of rapid and sustained change (Altbach & Knight, 2007). Higher education, therefore, needs a new kind of leadership; resilient leaders (Evans, 2010). Resilient leaders must be flexible and willing to redraw boundaries and adapt structures when changes to the system are perceived (Meadows, 2008). Traditional higher education leaders tend to maintain the status quo, which often causes them to become myopic (Garcia, 2006). Wooldridge (2011), states that the most effective leaders in education are those who propose innovation and change. While the higher education environment suffers from "resource reduction, increased stress and increased expectations" (Szekeres, 2006, p 141), collaboration, communication and innovation are essential. Marshall (2007) speculated that resilient leadership was a fundamental challenge of today's university. The author found three general concepts of resilient leadership: (1) Agility – the ability to embrace new models, new organizational relationships, and new technology; (2) Distinctiveness – seeking to understand differences and find a unique niche; and (3) Alignment – finding the optimal means for matching institutional resources with demands. According to Marshall, the ability to master these characteristics often determines the extent to which resilient leaders are effective.

A resilient leader's key challenge is the ability to be flexible, adaptable, and innovative within an increasingly complex and dynamic environment: to be the leader of change who is prepared to take

risks (Danielson, 2011). Resilient leaders actively foster good working relationships, clear communication, and strong buy-in at all levels of the institution (Hoffman, 2004). The primary task for leaders is to communicate that change is now constant not occasional (Comfort, Boin & Demchak, 2010; Davison & Burge, 2010). Wheatley (2005) stated that resilient leaders must focus on the people involved in the change and not on the structure of the university. Resilient leadership calls for a focus on the people expected to work with the change rather than relying upon a devised system or structure because there is a tendency for people to get easily overwhelmed when experiencing change (Christman & McClellan, 2012; Daft, 2007).

Resilient higher education leaders must reward innovation—or at the very least not reject it (Coutu, 2002; Lane, Ennis, Mense & Richardson, 2009). Becoming a resilient leader will require innovation, foresight, and effective communication with all groups (Comfort, Boin & Demchak, 2010). Resilient leaders must equip themselves with the capacity to adapt to the turbulence ahead (Weller & Anderson, 2013). In addition, resilient leaders embrace the reality of continuous, unpredictable future change, and look for ways to survive the ireversible changes that have occurred (Meyer & Kirby, 2010). Resilient leaders focus their energy on creating ways to adapt to irrevocable change, and explore ways to anticipate future changes (Wooldridge, 2011).

Resilient leaders do more than bounce back—they bounce forward (Zolli & Healy, 2012). With speed and determination, resilient leaders take action that responds to new and ever-changing realities, even as they maintain the essential operations of the organizations they lead (Allison & Reeves, 2011). However, a resilient leader pays attention to relevant data and recognizes both opportunities and omens of disaster (Hemsley-Brown & Oplatak, 2006; Tjeldvoll, 2010; Vaira, 2004). Resilient leaders create a positive climate in which individuals feel encouraged to create a better future (Boyatzis & McKee, 2005). Resilient leaders continually work with individuals and other organizations to acquire support and resources (Kotter, 2007). Resilient leaders draw on diverse perspectives to make well-informed decisions that ultimately create new realities in innovative organizations (Goodwin, 2009).

Capacity Building for Resilient Leaders

The basic tenet of resilience theory is that change is perpetual and inevitable (Hamel & Valikangas, 2003). the key to managing resilience successfully is to acknowledge it and prepare thoughtful, adaptive individuals to respond (Frank & Gabler, 2007; Walker & Cooper, 2010). It is important to note that innovation in response to change takes resources–not just one-time resources, but a continuous investment in the individual (Kleindorfer, Singhal & Wassenhove, 2005) which means that professional development and capacity building for resilient leaders. Resilience theory embraces the reality of continuous, unpredictable future abnormality and requires techniques to adapt and survive irrevocable changes (Hoffman, 2004). Resilience does not require a precise capacity to predict the future (Marshall, 2010), only a capacity to absorb future events regardless of their magnitude or severity, meaning that resilience is the capacity to change (Drew, Ehrich & Hansford, 2008). Any action that builds the strength, flexibility, or sustainability of the organizational leader builds capacity and adaptability (Blanchard, Meyer & Ruhe, 2007). Typical capacity building strategies involve networking, training, organizational reform, devolution of responsibilities, and im-

proved information flow (Christman & McClellan, 2008; Goldstein, 2012; Henry & Milstein, 2006).

In a learning organization, the leaders are the most preeminent, most conspicuous and conscientious of learners (Baer, Duin & Ramaley, 2008; Blanchard, Meyer & Ruhe, 2007; Kaiser, Hogan & Craig, 2008). Fiksel (2006) suggested four characteristics which can be used on different personal levels to increase the resiliency of a leader:

- Diversity--existence of multiple forms and behaviors;
- Efficiency--performance with modest resource consumption;
- Adaptability--flexibility to change in response to new pressures;
- Cohesion--creating or using existing unifying forces or linkages.

The need to navigate change and adjust to it is widespread in higher education (Gray-Donald & Sterling, 2007). Cherkasky and Sobin (2008) and Evans (2010) point to the challenge of leading uncertainty in the higher education environment which involves the courage to take action when the longer-term way ahead is unclear. Not surprisingly, it has been suggested that a capacity to support and develop resilient leaders capable of handling complexity, engaging people in vision, partnering effectively and leading through change is "not a luxury but a strategic necessity" for today's universities (Drew, 2006, p. 118). In addition, Kotter (2007) states that the ability to guide change as the ultimate test of a leader. In order to thrive amidst the unknown, resilient leaders must embrace innovative ways of interacting consistent with change (Cherkasky & Slobin, 2008; Proenza, 2010). Resilient leaders should motivate an end to old structures or roles

and create new frameworks for work (Bates, 2010; Mark & Semaan, 2008).

Reinventing Higher Education Using Resilient Leaders

Leadership in higher education requires increased resiliency during these difficult times (Drew, 2010, Wooldridge, 2011). The resilient organization absorbs shocks and 'bounces back' after a disturbance (Grey, 2013; Szekeres, 2006; Zolli & Healy, 2012). In order to bounce back or more appropriately, bounce forward, leaders must engage faculty, staff, students, and community members (Krasny, Tidball, & Sriskandarajah, 2009; Scott, Coates & Anderson, 2008) in reinventing themselves to improve student learning, increase degree production, refocus research and innovation, and reduce costs (Gough & Scott, 2007; Korhonen & Seager, 2008). This is a call for reinvention in the way higher education conducts the fundamental business of the day (Avery & Bergsteiner, 2011; Barnett, 2004); this is also a wake-up call, indicating that what currently exists is not sustainable (Lee, McCann & Selsky, 2009; Meyer & Kirby, 2010; Somers, 2009; Yielder & Codling, 2004). Institutional leaders will need to join with all stakeholders in developing this shared mission of resiliency, sustainability, accountability and affordability (Folke, Carpenter, Walker, Scheffer, Chapin & Rockström, 2010; Lane & Klenke, 2004; SchWeber, 2013). If reinvention is to be adopted, leaders must share insight from short-term decisions, mid-term commitments, and long-term strategies for the future (Crichton, Ramsay & Kelly, 2009; Drew, Ehrich & Hansford, 2008).

Enlightened and effective leaders, highly engaged faculty and motivated students should provide the opportunity for innovation in higher education (Schofer & Meyer, 2006). Connecting the power of innovation for higher edu-

cation is not a novel initiative (Teichler, 2006). Unless higher education administrators are prepared to not only adapt to change, but to lead their institutions through the change process (Lane, Ennis, Mense & Richardson, 2009), many in higher education will continue to struggle (Peters, 2010; Tapscott & Williams, 2010). Educational leaders are subjected to changes in teaching/learning and administration that have impacted everyone with the immense social pressures to improve educational opportunities for all students (Baker & LeTendre, 2005).

With the rapid technological advancements resilient leaders are the key to overcome institutional inertia and resistance to change (Farmer, 2010; Peters, 2010). The current higher education system was built on an industrial model fit for an industrial economy (Morris, 2009; Schofer & Meyer, 2006). However, life in the information age requires different skills and knowledge essential to succeed in this new era (Drew, 2010); skills embedded in resilient leadership (Carmeli, Friedman & Tishler, 2013; Harvey & Williams, 2010). Weick and Sutcliffe (2010) speculate that higher education leaders must successfully complete five tasks to maximize resiliency:

1. Track small failure
2. Resist oversimplification
3. Remain sensitive to operations
4. Maintain capabilities for resilience
5. Take advantage of shifting locations of expertise. (p. 2)

The Future

In the globally competitive and commercialized higher education institutions of the 21st century, societal and political forces mandate that institutions increase access and equity while concurrently decreasing expenditures (Aviram & Talmi, 2005; Lentzos & Rose, 2009).

These new demands and expectations create opportunities for individuals in local, national, and international arenas who have the knowledge and expertise to be resilient leaders and construct innovative organizations (Fiksel, 2006; O'Malley, 2010). Furthermore, policy makers view changing the purpose of education from preparing workers to fit into a constant economic system and structure to preparing flexible (Glenn, 2008; Heifetz, Grashow & Linsky, 2009), intellectually capable workers with skills who can modify and adapt to future occupational demands (Avery & Bergsteiner, 2011; Levy & Murnane, 2007; Secundo, Margherita, Elia & Passiante, 2010).

Organizational leaders most often fall prey to a tendency toward advocacy for the current rather than inquiry into the possible (Allenby & Fink, 2005; Glarovic, 2005; Patterson, Goens & Reed, 2009). However, looking ahead, resilient leaders need to strive for an innovative organization capable of managing unpredicted changes relying on the capacity of the organization not only to absorb shocks but to evolve with them, becoming resilient (Comfort, Boin, Demchak, 2010; Framer, 2010). Resilient leaders recognize that change is inevitable, but with inquiry the innovative organization can absorb disturbance without the overall well-being of the organization being threatened (Allison & Reeves, 2011; Bhamra, Dani & Burnard, 2011).

The nature of organizations demands leadership and innovation (Arond-Thomas, 2004; Burnard & Bhamra, 2011). Resilient leaders are essential to innovative organizations and innovative organizations drive leaders to be more resilient (Carmeli, Friedman & Tishler, 2013; Moran & Tame, 2012). Such a symbiotic relationship increases the chances that the organization and the individual will be more successful when

resilient and innovative than when stagnant (Branson, 2009; Drew, Ehrich & Hansford, 2008). Higher education can benefit from an examination of the characteristics of resilient leaders and how they can help the organization be more innovative, resourceful, adaptable, and successful (Salmi, 2009; Scharmer, 2007; Tapscott & Williams, 2010).

Concluding Thoughts

Given the current environment in higher education, the authors pose the following questions for consideration:

1. Are today's higher education institutions built on resilience?
2. Do higher education institutions need or want resilient leaders?
3. If resilient leaders are needed, how are they being prepared?
4. What are the responsibilities of innovative organizations to create environments for resilient leaders to grow and mature?

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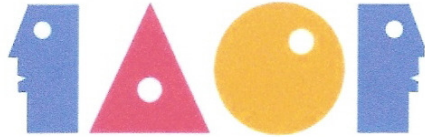
THEORETICAL and METHODOLOGICAL ASPECTS of the ESSENCE of INNOVATION IN the CONTEXT of MODERN APPROACHES

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Studies the development of theoretical views on the concept of innovation based of leading scientists. The differences in the interpretation of economic categories «innovation» among the founders and representatives present. Based on the analysis of modern approaches to the definition of basic concepts have been generalized formulation gives its own notion "innovation".

Keywords: innovation, theory of innovation, innovation development, innovation process, globalization.

Statement of the Problem

An established fact today is that innovation - is an essential foundation for sustainable and effective social and economic development, an important mechanism for updating the real economy, the main factor in increasing the country's competitiveness and the implementation of progressive structural changes in general. One of its features is the wide scope of use in any and all areas of the economy and in everyday life. It is clear that a particular interpretation of innovation depends on the method of the natural sciences, the purpose of research or from our everyday perceptions. Given the above, it can be stated that the term "innovation as information - no single definition" (Krupka, 2001, p 20).

In the recent literature, both in scientific and in journalistic terms "innovation" and derivative concepts such as "innovation development", "innovative model", "innovation", "innovative process" can be seen in nearly every print publications. Each author defines his or her own vision and interpretation that are sometimes quite complicated, multifaceted and contradictory.

Note that, at the present time there are many definitions of basic concepts of innovation and a range of scientific approaches to their interpretations of terms, the economic substance and display features. However, the lack of unanimity and the presence of significant differences introduce a contradiction in interpretation of key terms of innovation theory and their understanding of contemporary society. So take urgent issues related to the generalization of the economic substance of the concept of "innovation" and consideration of theoretical approaches from different areas of economic thought.

The economic essence of innovation, their use and implementation, rather deeply investigated by a galaxy of prominent both foreign and domestic scholars who examine different aspects of innovation approaches based on their interpretation of the essence. It is important to emphasize that in the literature there are different views and approaches to defining the essence of the concept of "innovation". In particular, scholars such as Joseph Schumpeter, Harold Barnett, Brian Twiss, Paul Zavlin, Anatoly Kazantsev, Levan Mindel, Leonid Gohberg, Robert Mueller, F. Nixon, John Perlaki, Boris Santo and others interpret this concept based on the object and the subject of the research. For example, Robert Mueller understands innovation as a change on the specific system environment. As a process in which an invention or idea becomes economic sense, defines innovation Brian Twiss. Innovation is - the introduction of anything new regarding the organization or its immediate environment claims K. Knight.

For the purposes of this paper, we will look at the works of scholars such as L. I. Kolenskoho, G.A. Kundyeyeva, V.N. Lapin, M. Porter, P. Whyte, H. Hartman, V.U. Yakovets, who see innovation broadly - as a complex process that is in development and use of ideas, inventions, in order to improve livelihoods and more fully meet their needs.

Fundamentals of scientific economic knowledge regarding the merits of innovation were also deeply studied and presented in the works of local scientists. In particular, L.L. Antonok, M.P. Denysenko, S.F. Pokropyvnyy, Y. Rizhenko, A.M. Sobko, P.S. Khariv, considering innovation as a result, developing towards research concepts "innovation process "," research and experimental development." Scientists Adamanova S. A., V. Koval-

chuk, M. Krupka, A. Peresada, V. Fedorenko, innovation is understood as a process, a new approach, extending its concept of "innovation development", "innovation activities "and" innovation economy."

The writings of these and many other scientists discuss different aspects of innovation in business and enterprise development and the economy, but despite the growing volume of research in the field of innovation, today is an ongoing debate about the nature of this concept, the economic substance of innovation and innovation processes, innovation homogeneity and their impact on the development of the country and its regions, and hence the need for further research in this area in globalization changes.

Problem

Conduct a thorough analysis of theoretical views on the theory of innovation. To investigate differences in the interpretation of the economic category "Innovation" among the founders and representatives present.

The Main Material of the Study

New economic categories considered one of the founders of Innovation Economics Austrian Joseph Schumpeter's classic, considered the main figure and founder of the theory of innovation. In his work "The Theory of Economic Development" scientist first addressed the issue of new combinations of changes in development (i.e. questions innovation) and gave a full description of the innovation process. He argued that innovation is a historical phenomenon that causes irreversible changes in the production of goods. If instead of varying the factors we change the production function, we will have innovation. Schumpeter initiated and looked at such studies of innovation; it laid the foundation of all subsequent and Schum-

peter was looking to create a synthetic theory of innovation and gave impetus to the development of further works of Western European and American scientists: H. Lesser, M. Kaletski, B. Tvisa, D. Sahala, C. Freeman, J. Clark, J. Barnett, J. Witte and others, by which finally formed the view of innovation as a major source of social and economic development of society.

The world economic practice among scientists, there are two points of view, the interpretation of the main provisions of innovation theory. In one case, innovation is defined as the outcome of innovation, embodied in the form of improved products and technologies, and the rest - is the process of implementing new ideas, products, items, and transform their approach instead of implementing the existing. Both of these approaches are widely used in modern literature and are considered in static and dynamic aspects. The basis of the dynamic approach are the views of scientists A. Alimov, S. Volodin, M. Volynkin, A. Halchynskiy, A. Grinyova, I. Grishina, V. Evtushevskaya, V. Medynskoho, Y. Morozov, A. Suvorov, B. Twiss , L. Shapovalov, defining innovation as social feasibility process that includes research, design, development, production, commercialization and distribution of a new product, process or system. However, N. Goncharov, G. Hamidova, I. Balabanov, A. Vasilyev, P. Zavlin, N. Molchanov, I. Pavlenko, G. Shvydanenko indicate that impressed them more static approach, i.e. any new product is introduced as service with improved properties, by means of its production, sources of raw materials, markets, and organizational management, socio-economic decisions of industrial, financial, commercial, etc. character.

A striking example of this approach is the interpretation of S.M Illyashenko: "Innovation - the end result of the creation and use of innovations embodied in the form of new or improved products (goods or services), production technologies, management practices at all stages of production and distribution of goods that contribute to the development and improvement of the enterprises "(Ilyashenko, 2006, p.11). In our opinion, the static and dynamic approaches to the interpretation of the essence of innovation must be combined because they are logically complementary.

Innovation as a process is innovation, in which the accumulated innovative changes become final result - the product. According to the Ukrainian author L.L. Antonyuks, A.M. lieutenant and V.S. Savchuk, depending on the object and subject of research innovations can be seen from the perspective of three approaches, as a process and as changing as a result. It is this aspect of the expanding field of studying the essence of the concept of innovation, resulting in a need to know in more detail with modern approaches.

Many economists believe that innovation - the process: technical, economic, socio-economic or complex, which is the use of improved goods or equipment (K. Freeman), developing new ideas, inventions (W. Hipel and F. Rihs), with to improve livelihoods and meet their needs more fully. According to O. quotes innovation - is a complex process that involves the creation, development, reduction to commercial use and dissemination of new technical or any other solution that meets the specific needs (Lapko, 1999, p.38). For interpretation of AA transplant, innovation - the process of bringing scientific ideas and technological invention to the stage of practical use, that makes a profit, as well as the associated process feasibility and other changes in the social environment (Peresada, 2002, p.160). This is confirmed by the author remarks D.M Chervanyov and L.I Neykov that define innovation as the technical and economic process which, thanks to the practical use of the product

of mental labor - ideas and inventions that will create the best properties for new products and new technologies that are appearing on the market as innovation, can provide additional income (Chervanyov, 1999, p. 25). With the same views and opinions intervening Russian researchers Medynskoho and V.G. Sharshunova to interpret innovation as social, technical, economic process that leads to the creation of the best in characteristics of goods such as services and technology through practical application of innovation.

The most comprehensive definition of innovation gives the Hungarian economist B. Santo, who notes that innovation - is a socio-techno-economic process, through the practical application of ideas and inventions will create the best products in their properties, technologies, and if innovation focused on economic gain, profit, its appearance on the market can provide additional income (Santo, 1990, p. 213). Looking at innovation as a process, this group of scientist's shows that it comes from innovative ideas that evolved over time, gradually and consistently specified, transformed from the abstract to the real, understood and materialized.

The study of innovation as a process implies that at every stage it searches because, in our opinion, it is difficult to predict that research will provide new knowledge that it will find industrial application, and whether they have commercial success. In addition, often the result cannot be estimated as innovation at this stage, because the result will be obtained through a rather long time.

The study proved that L.L. Antonjuk, A. Daci, A. Poruchnyk, V. Savchuk, A.B. Sumets, V.S. Tubalov, Y. Yakovets followers approach that presents innovation as a change that allows to reveal patterns of emergence and development of innovation and identify their implications. Innovative changes as an integral part of the

process of formation of innovative thought F. Valenta, who considered innovation as a change in the original structure of the production mechanism, i.e. The transition from its internal structure to a new state: refers to products, technologies, production facilities, professional, qualification structure of the workforce Organizations and changes of positive and negative economic consequences.

This same view is shared by Y. Yakovets considering innovation as qualitative changes in production related equipment and technology as well as forms of organization of production and management (Uskorenya, 1988, p. 27). However, Slovak scientists Vodachek L. and A. Vodachkova understand innovation at the target change in the functioning of the enterprise as a system. It can be qualitative or quantitative, concerning the scope of a business activity. This interpretation defines the essence of innovation, which is to change the product mix, in the process, the management structure of the organization of production and work to ensure economic growth and social impact of the use of all resources.

However, in our opinion, this approach is more limited, because in terms of the aim in creating innovation, change is not always the end result, but only the means to achieve it. Consideration of innovation as the changes do not allow exploring the dynamic nature of innovation identifies effective forms of organization innovation mechanism and improves management.

A number of economists consider innovation as process itself and does not change on its own, which was due to qualitative changes in the production process. Many supporters of this position among domestic scholars, including A. Sobko and P.S. Khariv believe that innovation - the result of innovation, reflected in scientific, technical, organizational or socio-

economic innovations may be obtained on any stage of the innovation process (Khariv, 2003, p. 13). This view is held by M.P. Denysenko and Y. Rizhenko who view innovation as a result of the introduction of innovations to changes in facility operations and obtain economic, social, or other type of effect.

A similar view, namely that innovation - the result of which was embodied in new or perfect product, process, used in practice, or new approaches to the problem of social services expresses L.A. Omarbakyev (Omarbakyev, 2010, p. 8). Among the scholars who support this definition, we can distinguish Russian scholars G. Hamidova, A. Kulagina, OA Myzrovu et al. They see innovation as the end result of intellectual activity that meets the specific needs and bring positive socio-economic impact.

F. Nixon believes that innovation is - a combination of technical, industrial and commercial activities that give rise to the emergence of new markets and improved industrial processes and equipment (Ynnovatsyonny, 2003, 500). According to the author, here it is actually not the same innovation and policy measures that will eventually have to contribute to innovation as such, including the market. Thus, it is an important role in the success of innovation by providing activities related to the organization and management of production process, but understanding the term "innovation" is not the process itself, but actually the result, which is due to qualitative changes in the production process. Around the same views on the definition of innovation follows scholar R.A. Fatkhutdinov that defines innovation as "the end result of the introduction of innovations to change the control object and obtain economic, social, scientific or other type of effect" (Fathutdynov, 2002, p. 24).

In our view, it is more appropriate is to define innovation in a broad sense as a

final result of innovation in order to obtain a positive effect. This interpretation makes it possible to quantify the progressive change, to evaluate the effectiveness of innovation at the level of individual companies and the region and the country as a whole. Famous American futurist Alvin Toffler said that among the problems faced by the business, there is no more important and more complex than the problem of innovation. In the literature on innovation development often along with the term "innovation" is found and used the notion of "innovation". In particular, foreign literature, in most cases, the terms "innovation" and "innovation" is not shared, while the Ukrainian and Russian scholars interpret them differently.

According to some Ukrainian scientists inappropriate to equate these two terms. After all, innovation - the process of bringing scientific ideas and technological invention to the stage of practical use, for profit and innovation is essential to be novelty and lasts from the birth of an idea to its commercial release, including complex relationships, production, exchange and consumption, that is the innovation of its kind of "intermediaries" between innovation and invention. Rightly A.V. Tychynskyy shared concept of "innovation" and "innovation" by the power of influence on organizational and production processes: innovation leads to radical change and innovation - to improve the production process and the product itself. According to IG Bug innovation can be an element of innovation, but not its counterpart (Bug, 2002, p. 96)

The concept of innovation and innovation distinguishes S.F. Pokropyvnyy, he believes that innovation processes that it can take place in any complex industrial and economic system, a collection of innovative, high quality new changes that continuously occur in time and space. The result of the innovative processes he con-

siders innovations and their implementation in industrial practice - innovation.

However, in recent years, some authors have turned identify these concepts, as they have in common is that they reflect the development and updating. Thus, V.A. Konoplitskyy and G.I. Owl define innovation as innovation in engineering and technology, air ' results from the creation of a new direction - sectoral or sub-sectoral, involving the development of a new program or approach that accelerates progress and based on scientific discovery (Konoplitskyy, p. 179). G.V. Osovska, A.A. Yushkevich define innovation as the implementation of new forms of work organization and management, covering not only the individual company, but also the industry and the economy as a whole and is a prerequisite for the development of production, improve product quality, increase production capacity companies, new products and services as well as a means of adapting enterprises to market changes by adjusting its own strategy.

From this perspective, one could argue that "innovation" is allied with the concept of "innovation", but not identical, and thus it is a mandatory component. Innovation always acts as the final result of the economic entity and innovation - is a means by which to create innovation. The fact that some acts innovation, others can be used as an innovation. In this context, we consider appropriate to consider innovation as a positive result of implementing innovation.

From the point of view of others, the concept of "innovation" - a domestic equivalent English term "innovation". They agree OI Pampura, which claims that innovation is none other than one of the options Ukrainian English «innovation», and therefore do not need to "... look for differences between innovation and innovation" (Pampura, 1997, p. 35). Since the term "innovation" is enshrined in current

legislation and recognized international regulations.

International standards in innovation interpret innovation as the outcome of innovation. This is recorded in the Guidelines Frascati (Frascati Manual), which proposed standards survey of research and development in relation to their compliance with innovation, as well as the recommendations of Oslo (Oslo Manual), which include international standards on the collection and analysis of data on innovation. Today description of technological innovation based on international standards, guidelines of which were adopted in Oslo in 1992 (the so-called "Oslo Guidelines"). These standards cover new products and new processes as well as their significant technological changes (Izhevsk, 2010, p. 123).

Obviously, the proposed definitions accent one aspect of this phenomenon, which is essential in the study. According to the Law of Ukraine "On the innovation", "innovation - a newly created (applied) and (or) enhanced, competitive technologies, products and services, as well as organizational and technological solutions of production, administrative, commercial or otherwise, which significantly improves the structure and quality production and (or) social services " (The Law of Ukraine, 2002). This interpretation of the essence of innovation is concerned only with the means of production or process that is necessary but not sufficient condition which should guide the entire flow of investment resources in the fields of national economy with its efficient use. These aspects should be taken into account when considering innovative development of Ukraine.

Given the lack of a unified approaches to the definition of the content categories of economic innovation, both domestic and foreign scholars based on the analysis of scientific papers can offer a

definition of "innovation" - a new achievement, the implementation process which will provide innovative development of the national economy; innovation which will be to rebuild all spheres of social life or individual industries; organizational measures that significantly improve the structure and quality of social services, providing for the achievement of economic, scientific, technical, social, financial and resource impact and enhances the competitiveness of the national economy as a whole. The proposed definition expands the understanding of innovation and makes it possible to analyze the degree of innovativeness not only manufacturing firms can directly identify fruitful component, but also services, government, commercial and other activities where innovation acts as a management decision taken in the context of globalization.

Findings from the Study

Summarizing the above, we can conclude that today there are many definitions of the basic concept of "innovation" and scientific approaches to their interpretations. Review, analysis and synthesis of the literature indicate a lack of unity of modern approaches to the interpretation of scientific innovation terminology. Based on the results of theoretical research can offer clear, in our view, the approach to the definition of this concept.

However, despite considerable interest in the nature of "innovation" by many scholars in many of the studies, the study of specific features determine the theoretical, methodological and practical significance, coherent theory of innovation has not yet been developed. Many important issues have not yet found a solution. Thus, the process of formation of the theory of innovation is development through a critical rethinking of the current views on the nature of innovation and patterns of innovational development in a globalizing world.

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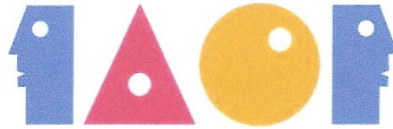
TEACHING ONLINE?
A GUIDE ON HOW TO GET STARTED

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Abstract

Online courses are convenient and offer flexible hours, which is attractive to working adults who are looking to pursue their education. Online courses that are properly designed will have the same level of quality and rigor as a face-to-face course (Brown, 2012). The instructor plays a critical role in the quality and success of the course. Setting online students up for success involves proper preparation and acknowledgement of online student retention strategies. This can be accomplished by providing clear pathways of learning, SMART learning objectives and outcomes, outlining tools for communication and collaboration, and humanizing your course by building community. Increased learner satisfaction is the result of the refinement of online instructional practices and continuous communication technologies.

Key Words: Online Teaching, Building Community, and Course Introduction Video, LMS, Learner Satisfaction, Online Student Retention

Introduction

Planning to teach a class online involves more than transferring your lectures and textbook to an online learning management system. There is much to consider in humanizing the online learning environment and adding content that is conducive for online learners. One of the most prominent obstacles contributing of online learners is the feeling of isolation, which ultimately leads to withdrawing from the online program (Ludwig-Hardman & Dunlap, 2003). Careful planning of the online course, paying special attention to online student retention strategies will provide outline students with a framework for success.

Develop Goals for the Course

As you prepare and plan the online course, it is critical to first decide what students need to achieve upon conclusion of the course. In other words, begin with the end in mind. Think of how to achieve that goal while preparing the course. Revisiting the course objectives and making sure they align with the overall program objectives is an essential exercise. It is important to know how to prepare the students for an effective learning experience.

Learning Management System

The Learning Management Systems (LMS) is the delivery software that encompasses a range of tools that help support and administer courses in the online learning environment (Iqbal & Qureshi, 2011). The LMS, allows instructors to shift the delivery of content from a traditional, face-to-face environment to an online and virtual learning environment. With the introduction of new emerging technologies and continued growth of online course offerings by institutions, many institutions have begun using Blackboard, Desire2Learn, Moodle, and Canvas. The compatibility of Learning Tool Interoperability (LTI), which enables a seamless connection of external webbased tools with the LMS, allows students and faculty to enter the institution's LMS and have access to previously external only education resources.

It is important to become familiar with the functions and specific features offered in the LMS and any LTI's pertinent to the discipline being taught. Basic features of an LMS include the following:

- Manages learners, courses, instructors, and resources.
- Provide reports – system-wide, course-specific, learner-specific.
- Built-in analytical tools that help the instructor make data-driven decisions for instruction.

- Communication tools – such as email, discussion forums, and chats.
- Assessment tools – allow for quizzes and exams online.
- Gradebook – storage of all course grades based on various assignments and assessments.
- Dropboxes –where students submit their projects or assignments in electronic format. (*Note: Not every LMS has a Dropbox feature*)

As an online instructor, it is important to understand the basic features of the LMS and have a working knowledge of the tools. If not, it would be difficult to assist students. The minimum LMS competencies for online instructors include (but are not limited to):

- Create a course announcement
- Send email within the system
- Establish notification structure for communication
- Create a content folder
- Upload content and documents
- Create, participate, and moderate discussion forums
- Create various types of assignments
- Create quizzes or online assessments
- Reset a quiz or online assessment
- Set up groups
- Manage the discussion board
- Set points, criteria, and rubrics for assignments
- Run reports for analytics
- Set up and use of the grade book
- Submit course grades
- Copy course content to use again for another term

Prepare Your Students for Online Learning

When thinking about preparing students for an online course, the goal is to set them up for success. Most institutions have a student orientation course, especially for online programs, that provide

students with the basics of how to get started with their online courses. If this is not the case, the students will need an overview of the basic LMS tools, where to find technical help and strategies for effective online learning. Another option is to include a brief orientation in the first week of a course. This could be text-based, hyperlinks, or even a screencast with free tools such as Jing.

Students need to feel a connection with their instructor and a great way to get started building community and establishing rapport is to create a course introduction video. This video does not need to be elaborate or a highly produced video. In fact, the more casual the introduction video is, the students will be able to relate to the instructor. A few tips for creating the introduction video:

- The video should be between 3-5 minutes.
- Have good frontal lighting, so you do not have shadows on your face.
- Remember to speak loud and clear and focus on the tone of your voice
- Make sure the background scenery is tidy and appropriate.
- Do not feel the need to film the introduction video at a desk. Instead, consider filming the video at a favorite location or while doing a hobby.

To help the students succeed, include the following in your course introduction video:

- Set expectations for the course and outline the learning objectives.
- Let the students know where to find a sample exemplary, mediocre and poorly written discussion board post..
- Tell your students how they can be successful in your online course. Provide specific tips on what to focus on and how to prepare and plan

for assignments, projects, and assessments. Remind the students of the need to be organized and active in the course daily.
- Share the technical support process for the institution. Avoid receiving emails and calls concerning technical issues. We recommend the 3 before me rule. Require 3 steps the student must take before contacting the instructor. For example, step 1 –perform a computer system self-check, step 2 – contact the help desk, step 3 – submit a ticket. If the technical issue is still not resolved, they may need to contact the instructor.
- Offer virtual office hours. Remember, the students do not have the convenience of just dropping by the office to ask questions.
- Let the students know communication preferences. This can be by email, phone, text, or during virtual office hours.
- Avoid giving specific dates for assignments or other items. This allows reuse of the course introduction video each term.

The benefits of recording an introduction video will be evident through the solid connections made with students and the diminished amount of questions that you receive from students. Next, consider recording additional brief videos to explain the teaching style and methodology applied in the course. Another idea for a video is to explain a complex assignment or project. The visual and audio aspects of the video will help students gain deeper insight to the expectations in the course. It also prevents questions to seek clarification. A brief video on how students will be assessed is another helpful topic.

Course Objectives

Learning objectives begin with an action verb, and the level/domain of learn-

ing should be balanced. Each objective should focus on a specific outcome that aligns to a skill or competency. To avoid having a long list of objectives, group sub-skills under a single objective.

When creating the course objectives, they need to be SMART (Hovelynck, 2003):

- Specific
- Measurable
- Attainable by the student and acceptable to the instructor
- Relevant to the topic and realistic to achieve
- Time-bound

When developing course objectives, they need to be student-focused. Think about: What will the student do to apply, analyze, synthesize, and/or evaluate knowledge, understanding and skills?

All course activities, assignments, and assessments must align to the established learning objectives. Additionally, the Bloom's taxonomy levels need to be balanced, aligned, and represent each level of the taxonomy. For example, if the learning objective for a task in Bloom's taxonomy is analysis, and the task requires synthesizing, the learning objective does not align. All learning objectives and the correlating assessment should align to have an effective online course.
Course Objective Samples:

By the end of this course, students should be able to:

- Evaluate the major philosophical sources of curriculum and instruction, curricular change, and curricular development.
- Examine and analyze the impact of ethics evaluations and intentions.
- Explain how knowledge about ethical decision-making can be used to improve business ethics.

Academic Integrity

With the convenience of the internet and other technologies, modern learners have more opportunities to be academically dishonest than students in previous generations (Watson & Sottile, 2010). In a recent study, students self-reported, 32.1% to cheating in on-campus classes, and 32.7% admitted to cheating in online classes (Watson & Sottile, 2010). Based on this data, there is no major difference. Students who cheat, will always cheat, whether it is online or in a face-to-face class.

Why students are tempted to cheat?

- Convenience
- Pressure to succeed
- Low GPA
- Unclear expectations
- Lack of study skills
    - o Note taking
    - o Poor planning

How can the instructor prevent cheating in an online class?

- Become familiar with student's writing skills
- Educate students about academic honesty
- Maintain security of assessments and assignments.
- Design projects and assignments to incorporate unique, in-the-field experiences (At work, in a local agency etc.)
- Explore alternative assessments
- Control the environment by providing specific parameters for assignments.

How can an instructor detect cheating in an online class?

- Plagiarism Detection Software
- Browser Lockdown

•Keystroke Pattern Recognition

Students need to be aware of plagiarism, so it is important that students are referred to the institution's policies on academic integrity and plagiarism. If plagiarism is suspected, it is never a pleasant experience. If proof exists that a student plagiarized, then action is required. It is imperative for the instructor to be very direct in explaining to students what can be considered as plagiarism. It is important to keep in mind that the appearance of plagiarized material may not be deliberate (Wheeler & Anderson, 2010).

Netiquette

Netiquette is the proper. accepted behavior online. In a sense, it is digital manners when it comes to emails, status updates and discussion board posts. The basics of these rules include using spell check, not typing with all capital letters, being truthful, being authentic not spamming, and exercising discretion in posts

When you are communicating online, no visual cues are available and peers may misinterpret intent. This is why you need to represent yourself with an understanding of the netiquette basics. Just remember, you cannot un-ring a bell. Once you type something online, it is difficult to retract.

Building an Online Community

Online students may experience isolation, especially at the onset of the course, which is a contributing factor for retention. Part of being an effective online instructor is understanding that students may be experiencing this and to initiate strategies that overcome student feelings of isolation through building an online community.

Strategies for building community in your online course:
•Welcome students to your course by sending an email and making a course announcement. (Include your course introduction video)
•Re-send welcome message after the drop/add period.
•Post a personal introduction of yourself in the discussion board and have your students do the same. (This can be done in any format, video, pictures, text or combination.)
•Be supportive and encouraging.
•Commend students via email.
•Model effective online interaction.
•Provide opportunities for collaboration
•Encourage students to join a social space.
•Send weekly email, giving a heads up on any upcoming assignments, acknowledging recently submitted assignments/projects.
•Sustain students' motivation.
•Provide feedback and support.
•Handle conflicts promptly.
•Acknowledge the influence of multiculturalism and cross generations.
•Promote student self-regulation of learning through the use of rubrics
•Use the evaluation data to continuously enhance your online course.

Conclusion

In conclusion, it is apparent that having a solid plan for designing and delivering an online course is critical to the success of the online student. Keeping learning objectives as the forefront of your planning will ensure that course activities, assignments, and assessments are aligned.

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Table 1. Evaluation Criteria for Submissions

Item	1	2	3	4	5	Comments & Notes:
Extent it is appropriate for the selected domain						
Extent it adheres to the guidelines for the selcted Module type						
Technical Adequacy						
Agreement with theory						
Contribution to Profession						
Significance for policy and practice						
Originality/Innovation						
Readability						
User-friendliness						
Ease of Application						
Overall Quality						

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INNOVATION TECHNOLOGY FOR INTEGRATION AND APPLICATION OF ICT IN RETAILING

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Abstract

This paper has focused on establishing special store brand integration through virtual channels for high quality agricultural products. In addition, the cooperation and alliance with other industries to develop business opportunities will be another focus. Also set up the special stores for display and sale in various outlets to build online shopping website platform and offer kiosk machine, convenient ways to local consumers and tourists to go shopping. The process is to improve in supplier delivery orders to build vendor management platform. The purpose of this paper is (1) to discuss the in-depth for application of ICT innovation technology (2) to improve enterprise business processes of value-added services provider and replenishment, (3) the enterprise intercompany transfer cargo efficiently, and (4) reduce the stock rate.

Keywords: integration, retailing, ICT, innovation technology

Introduction

In recent years, the rise of services sectors has generated more and more interests on service-orientated and relationship quality (Wang, Ming-Chieh et al., 2013). The impact of economic and industry environment on operating mode of the traditional retailing has lost its competitiveness. Many suppliers deal with retailing store variety items, management inefficiency problems and then control each outlet inventory, sales situation, etc. It is how to create differentiated products, improve service quality and enhance service experiences to effectively expand consumer area and business opportunities. Due to the environment competition factors, make retail across industry district has increasingly fuzzy of development trend in multi- service. The price is transparent to emphasize quick and convenient era coming. The industry format must be applied to the information communication technologies (ICT) and services for more building and integration.

Over years, product quality and cost were emphasized as the core issues in obtaining and retaining the competitive advantage. on the other hand, active and innovative business models have been built through strengthening internal management mechanisms, processes, and virtual stores integration. With the information-processing efficiency, the emphasis has moved to delivery requirements. The development of supermarkets by the social economic changes in the environment and consumer purchasing behavior, supermarkets has been toward diversification, chain-stores management and information technology operations, to expand the scale of procurement, reduce operating and purchase cost, in order to improve business performance.

Types of goods on thousands of suppliers in supermarkets may also be thousands more. How to integrate suppliers to shorten the distribution schedule and reduce the purchasing cost are becoming the important issues for retailing industry. That is, retailers now focus on supply-chain management (SCM) systems that integrate the information of suppliers (Sorescu et al., 2011), marketing and sales, procurement, distribution and finance. It is therefore necessary for retailers to shorten delivery times and to decrease inventory through faster information transmission (Fu, Hsin-Pin et al., 2004). Different formats comply with discount stores, supermarkets, and the different type convenience store.

Industry channels with ICT applications create new types of service, such as vending machines, no unmanned shops and other outlets. The paper discusses the integration that EZPOS retailers applied to build online shopping

platform system, the model responsible for the success of the operation, with a view to assist other retailers in the introduction of information technology.

Literature Review

Information technology (IT) is generally considered an enabler of a firm's agility. In this paper we draw upon innovation diffusion theory (Brancheau and Wetherbe, 1990) and more recent conceptualizations of IT adoption behavior to examine systematic differences among Rogers' (1995) adopter categories. A typical premise is that greater IT investment enables a firm to be more agile (Lu and Ram, 2011). Lu and Ram (2011) also studied the premise that organizations need to develop superior firm-wide IT capability to successfully manage their IT resources to realize agility.

With the rapid development of consumer demand changes and information communication technology (ICT), retailers build different industry types, formats and different segments of the consumer market at the same time based on different business models. For example, the convenience store is a 24-hour mode of operation in response to the industrial and commercial demand for social and night life. Discount stores and supermarkets are in response to the diverse needs of marketing channels to shorten the process, saving the

cost of sales to enhance production and marketing efficiency.

The current socio-economic era based on the invisible, dynamic and intellectual capital performance point of view, is that the value-added of the economy, and to emphasize the quality and enhance knowledge management and technology integration. Khan's (2000) study used the seven procedure improving steps proposed by Harbour (1994) to improve the speed quality and cost of an air cargo service. Mohanty and Deshmukh (2000) also studied a case that implemented a supply-chain management system. To assist the traditional retailers industry in enhancing competitiveness via the online shopping, the Taiwan government has assisted companies in the introduction of information communication technology management systems.

Roberts and Grover (2012) investigate information technology (IT) facilitates a firm's customer agility and, in turn, competitive activity. Customer agility captures the extent to which a firm is able to sense and respond quickly to customer-based opportunities for innovation and competitive action. Drawing from the dynamic capability and IT business value research streams, to propose that IT plays an important role in facilitating a "knowledge creating" synergy derived from the interaction between a firm's Web-

based customer infrastructure and its analytical ability.

Sutcliffe's (1990) study included an in-depth discussion of 30 successful enterprise resource planning (BPR) cases. This will enhance the firm's ability to sense customer-based opportunities. IT also plays an important role in "process enhancing" synergy obtained from the interaction between a firm's coordination efforts and its level of information systems integration, which facilitates the firm's ability to respond to those opportunities.

Methodology

Model Development

After reviewing the relevant literature, the function of ICT application of EZPOS store system management (see Figure 1) and integration is including agricultural products online shopping platform and enterprise resource planning (ERP) in Figure 2.

EZPOS Store Management

Systems of EZPOS store management in Figure 3.

Category (server to server)

Suppliers in this category had management information systems (MIS) or enterprise resource planning (ERP) systems (Pan and Jang, 2008; Zhu et al., 2010) in Figure 4.

System Planning

The system had to enable users to acquire information ubiquitously through wireless handheld devices. It was therefore necessary to plan the system in advance. This included planning of system efficiency, wireless environment evaluation, user end-positioning, information and communication quality, and system security and redundancy (see Figure 5).

Figure 1. Application Model.

Agricultural products network platform		**+**	ERP	

Member integration mechanism	Set marketing products and dividend
Website maintenance operations	Order Management
Products integration mechanism	Interaction Management

Inventory Management	Accounting & Finance
Purchase Order	Receipts and credit
Media reporting	Bank notes
EZPOS Store management	Fixed assets

Cash flow

Online credit card	Postal Remittance
ATM	Payment
i-bon	Famiport

Logistics

Convenience store pick up	Mail
Shop-to-shop Distribution services	Delivery

Integration Center

B2B	CRM
Third-party	logistics

Figure 2. Structure of ICT Integration.
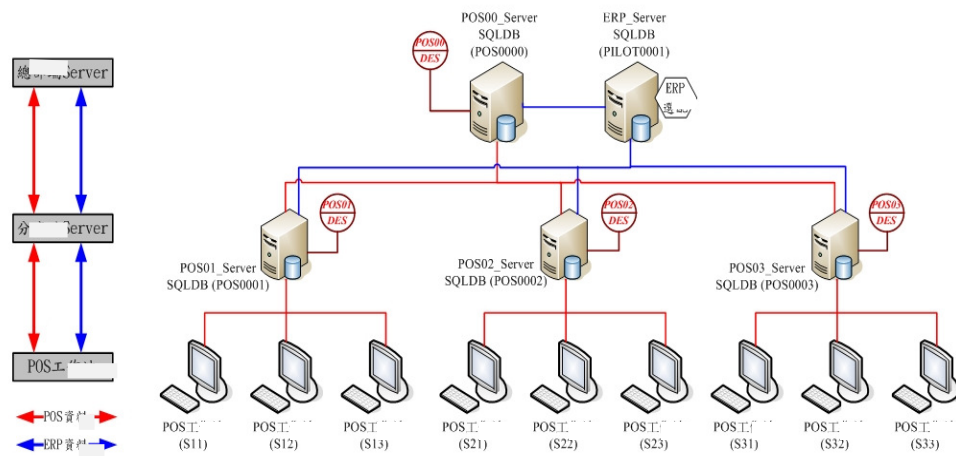
Figure 3 Systems of EZPOS Store Management.
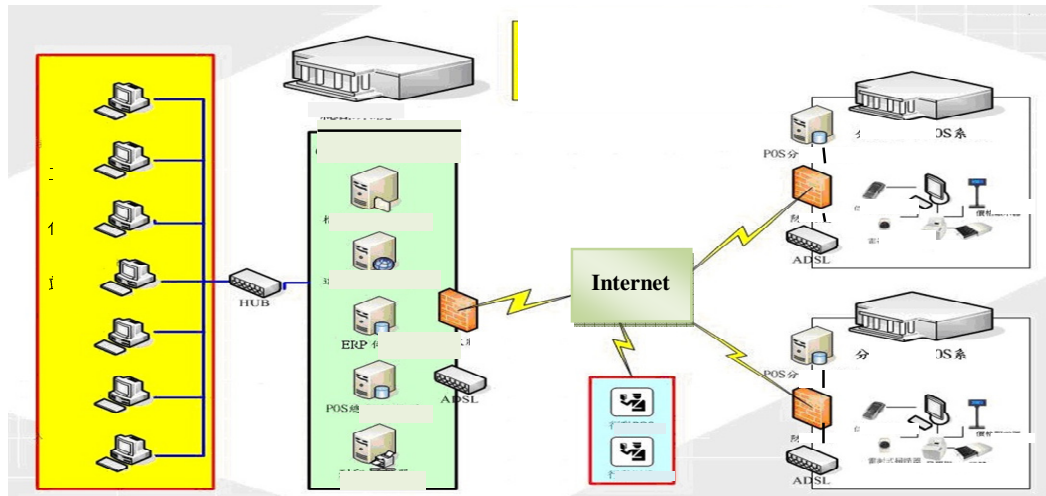
Figure 4 Information transmission model between EZPOS and its suppliers.
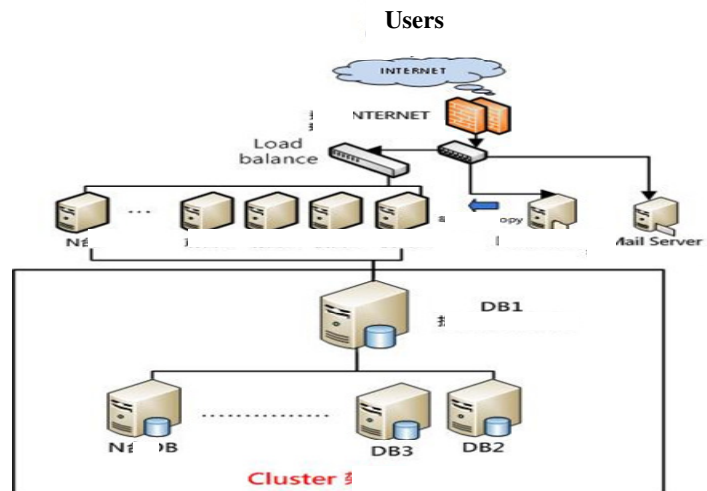
Figure 5. The flowchart of DB Cluster.

The functions of ICT application of EZPOS store management is including:

1. Agricultural products network platform:
   (1) Member integration mechanism
   (2) Set marketing products and dividend
   (3) Website maintenance operations
   (4) Order management
   (5) Products integration mechanism
   (6) Interaction management

2. Enterprise resource planning:
   (1) Inventory management
   (2) Accounting and finance
   (3) Purchase orders
   (4) Receipts and credit
   (5) Media reporting
   (6) Bank notes
   (7) EZPOS store management
   (8) Fixed assets

3. Integration content of items:
(1) Cash flow- online using credit card, postal remittance, ATM payment, i-bon (7-11), famiport (Family convenience store), etc.
(2) Logistics- convenience store to pick up, shop-to-shop distribution services, to mail, delivery, return of goods, etc.
(3) Integration center- business to business, customer relationship management, third-party logistics, etc.

Conclusion

To assist the retail industry in enhancing competitiveness to apply information communication technology, the Taiwan government has assisted companies in the introduction of supply-chain information management systems. Information Communication Technology (ICT) has collected and processed market information to adjust business strategy to increase the market competitiveness. The changes in the external environment emphasis on cost leadership, differentiation, and high quality marketing objectives, has been unable to meet the rapidly changing requirements of the market.

From research and development, the existing business process thinking and re-design based on customer demand from suppliers, purchasing, production, manufacturing to distribution, marketing, sales and customers on the basis of the ICT applications and services to the financial and other value creation process, is not easy to imitate with the competitiveness of innovative business process. Allowing employees to participate in enterprise management, to achieve effective communication within the enterprise and the expectations in the new process and operation of the new organizational structure, establish strong adaptability and greater flexibility, rapid response to market demand, which is business process reengineering (BPR).

The integration of ICT in retailers of innovation technology with multi functions of applications to implement a system. The system has the potential to integrate with cash flow, logistics, and enterprise integration center in enterprise resource planning (ERP). The model used for the implementation procedure of ICT that should provide a useful strategy for other traditional industries that want to integrate information systems to their companies.

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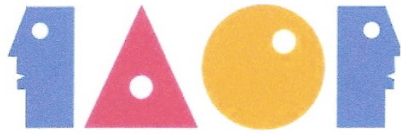
ORGANIZATIONAL BEHAVIOR OF EMPLOYEES IN THE MANUFACTURING ENVIRONMENT: AN ENGINEERING PERSPECTIVE

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Abstract

The behaviour of employees in the work environment is very complex and difficult to predict, even though there are many existing theories. Many factors can influence people's behaviour and complicate the situation, so it is essential that there is a model which is simple to understand and easy to use practically and yet also multi-factorial. The theories of McGregor (1960), Maslow (1970) and Vroom (1964) are mainly motivation models and are not taking account of personal performances in complex organizations. The model presented in this paper will try to fill the gap between motivation, performance and expectations in manufacturing company. The model used engineering approach for understanding personal behaviour and correlates it with professional performance. It is qualitative analysis and the pattern is observed on around 100 manual operators in Petrochemical industry and around 200 operators in FMCG industry. Here within, you will be presented with a model of employee behaviour based on the equation of state of ideal gases, an equation which is used in chemistry. Parameters of the equation adapted for working conditions in organisations will be defined and a qualitative analysis with proposals for a quantitative analysis given.

Keywords: Organizational Behaviour, motivation, performance

Organizational Behaviour of Employees in Manufacturing Environment

Organizational behaviour is the study of human behaviour in the workplace, the interaction between people and the organization with the intent to understand and predict human behaviour. The understanding of individual, group, and organizational behaviour is critical to success as a leader or a follower, and it requires a systematic study to even begin to grasp all of the variables that impact behaviour. It is an interdisciplinary field that includes sociology, psychology, communication, and management.

Theory X and Theory Y are theories of human motivation created and developed by Douglas McGregor at the MIT Sloan School of Management in the 1960s that have been used in human resource management, organizational behaviour, organizational communication and

organizational development. They describe two contrasting models of workforce motivation.

Theory X and Theory Y relate to Maslow's hierarchy of needs in how human behaviour and motivation are main priorities in the workplace in order to maximize output. Maslow's hierarchy of needs is a theory in psychology and he used the terms Physiological, Safety, Belongingness and Love, Esteem, Self-Actualization and Self-Transcendence needs to describe the pattern that human motivations generally move through.

The Expectancy Theory of Motivation, first proposed by Victor Vroom of the Yale School of Management, explains the behavioural process of why individuals choose one behavioural option over another. It also explains how they make decisions to achieve the end they value.

Theory X and Theory Y have to do with the perceptions managers hold on their employees, not the way they generally behave. Maslow theory is more focused on individual stages of human growth, not explaining behaviour in organization. Regarding Expectancy theory, Edward Lawler claims that the simplicity of expectancy theory is deceptive because it assumes that if an employer makes a reward, such as a financial bonus or promotion, enticing enough, employees will increase their productivity to obtain the reward.

McGregor, Maslow's and Vroom theories are motivation models and are not taking account personal performances in complex organizations. The model presented in this paper will try to fill the gap between motivation, performance and expectations in manufacturing company. The model used engineering approach for understanding personal behaviour and correlates it with professional performance. It is qualitative analysis and the pattern is ob-

served on around 100 process operators in Petrochemical industry and around 200 operators in FMCG industry.

Here is presented novel approach for employee behaviour based on the equation of state of ideal gases, an equation used in chemistry. Parameters of the equation adapted for working conditions in organisations will be defined and a qualitative analysis with proposals for a quantitative analysis given. In order to obtain quantitative parameters it will be necessary to do research in real economic conditions and then determine through correlation the values and dependence of each element of the equation.

Introduction of the New Model

The behaviour of employees in the work environment is very complex and difficult to predict, even though there are many existing theories. Many factors can influence people's behaviour and complicate the situation, so it is essential that there is a model which is simple to understand and easy to use practically and yet also multi-factorial. Here within, you will be presented with a model of employee behaviour based on the equation of state of ideal gases, an equation which is used in chemistry. Parameters of the equation adapted for working conditions in organisations will be defined and a qualitative analysis with proposals for a quantitative analysis given. In order to obtain quantitative parameters it will be necessary to do research in real economic conditions and then determine through correlation the values and dependence of each element of the equation.

The equation of state of ideal gases is:

$$PV = nRT$$

where: P is pressure, V – volume, n – number of moles, R – universal gas constant and T – temperature. If there is no

chemical reaction and no change in the aggregate state, the product nR is constant, and the equation takes the following form in equilibrium conditions:

$$\frac{PV}{T} = const.$$

This form of the equation will be the basis for defining the behaviour of employees, and the definitions of the elements will be as follows:
P – number of tasks or duties defined for a particular job, or requirements of superiors;
V – number of completed jobs and tasks, or employee responses;
T – internal state of employees, 'temperature', or motivation.

In order to keep the system in balance, the equation requires a constant value which would then cause satisfaction among employees and their supervisors. In case a small imbalance appears, it can be regulated by a timely and appropriate reaction. If the imbalances are greater, it is impossible for the equation to maintain a constant value and more radical changes are required.

The case that will be presented in paper is the one for employees who perform manual jobs or operators (process, manufacturing). The initial assumption is that employees, as well as gases, tend to the maximum value of V, if there are no constraints of (parameter P). The value of the parameter T varies according to the parameters P and V as well as the personal characteristics of each employee, and therefore it is the hardest to define. The limitations of the model are imposed by the necessity of a clear hierarchy and level of management, whether in company or project teams.

Behaviour of Operators

In the first case, the behaviour of the operators in the company will be examined according to the amount of work they perform, or their effectiveness. The parameters of the equation will be defined as follows.

P is the ratio of the required number of tasks and the defined number of tasks that must be performed by the operative within the given period of time, or:

$$P = \frac{P_{demand.}}{P_{def.}}$$

Pdemand. – the number of tasks that an employee is required to do by the manager, Pdef. – the number of tasks defined by a job plan and description. Ideally Pdemand. and Pdef. are equal, and P should be one.

The value of V is inversely proportional to the number of fulfilled tasks, or:

$$V = \frac{1}{V_{eff..}}$$

Veff. – the quotient of the number of tasks completed by the operative and required from him, within a defined period of time, or his effectiveness.

$$V_{eff.} = \frac{V_{finish}}{P_{demand.}}$$

In the case when employees successfully complete all assigned tasks, then V is equal to one.

The value of T is difficult to define uniquely, since it depends significantly on the personal characteristics of employees and in some ways it means job satisfaction and can be only represented as a function:

$$T = f(T_{type}, T_{size}, T_{motiv})$$

Ttype – satisfaction with the type of work done by the operative, Tsize – satisfaction with workload, Tmotiv - employee motivation. Generally it can be said that the more the employee is satisfied the higher T is and vice versa. The reference value for T will be one, that is when the employee is happy and motivated to the maximum.

A case will be considered to start when everything is in balance and the equation is in a constant state for a certain period of time. If we start with the main assumption V will tend to the maximum, or employees will perform less and less work. If this situation is not addressed in due course, V will grow more and more because the employees will consider their actions acceptable and tend to work less. Moreover, there will be a decline in T because employees are less and less motivated as they lose interest in the job. The equation falls out of balance, because P is constant, V is increased and T decreased, and the only way to return to the initial state is through the timely intervention of the manager.

The solution is – a better control of completed assignments, sanctions in the event of unfulfilled duties, assigning more work, or a clear definition of limits and reduction of V. When the equation returns to its original state of equilibrium, then the control decreases linearly and the number of commitments returns to the starting one. To prevent a sudden increase in V, it is necessary to constantly monitor the number of fulfilled obligations of employees and their job satisfaction.

In practice, there appears to be a special case when T increases together with an increasing V. This syndrome is known as "the less I do the more I talk", and such workers create an impression of doing more than anyone else and are therefore irreplaceable. If there is no clear control of duties, such employees are very difficult to uncover because the equation is in a state

of quasi-equilibrium. Although quite specific, this case is not uncommon, and employees who fit this description of behaviour can be recognised by: good eloquence, giving general answers to specific questions, having a little understanding of all the work but actually inadequate, they are very friendly and can be great demagogues. The only solution in this case is the specification of tasks and strict control of their execution as well as an evaluation of the employee capabilities. Such actions reduce the effect of self-promotion and generate only concrete results.

What happens if the equation is in equilibrium state and a manager requires from an employee to perform more tasks than defined? If we substitute values for P and V in the first equation we will get the form:

$$\frac{PV}{T} = \frac{1}{T} \frac{P_{demand.}}{P_{def.}} \frac{1}{V_{finished} / P_{demand}} = \frac{1}{T} \frac{P_{demand.}^{2}}{P_{def.} \cdot V_{finished}}$$

It can be concluded that the increase in the number of required tasks has a major effect on the overall balance of the equation which continues to affect the parameter T. If the number of required jobs is increased for one more beyond the defined ones and the operative carries out all required tasks, then the equation will be out of balance because there is a decrease in T. The employee will be dissatisfied after completing the tasks if his work is not adequately rewarded. If the requested job was only temporary, then the equation returns to its equilibrium state and it can be said that there was only a temporary imbalance due to work demands. However, if there is a further increase in Pdemand. there will be a further reduction in T, which will lead to increased employee dissatisfaction and decreased efficiency.

The only situation justifying a higher Pdemand. would be the one that enables

further advancement of the employee or an adequate compensation, that is, having a direct impact on motivation Tmotiv.

In all situations where there is an increase in Pdemand., great attention must be paid to the parameter T, as this will strongly depend on the personal characteristics of the employee, so that dissatisfaction can increase more or less as expected. Therefore, it is necessary to prepare first a detailed personality profile of the workforce and then on basis of that, plan a further career development for each individual employee.

As an exception proves the rule, so in practice a situation can be found when the initial assumption that V tends to a maximum does not apply, or that the employee, because of his personal qualities, performs more and more work. This means that Vfinished grows but also T increases, so the equation comes into a new steady state, because the employee is self-motivated. This balance will last for a limited time because the motives of the employee to work more may be different - the expectation of promotion or additional financial gain due to work commitment, ambition, or simply efficient delivery hours. If the expected gains are not achieved then the employee will work less and less, or at least no more than as defined. Self-motivation is rarely found with end-operatives and they should be recognised promptly and the most efficient use made of their capabilities.

Parameter T

$$T_{type} = \frac{a}{100}$$, a – percentage satisfaction with the type of job (0-100%)

$$T_{size} = \frac{b}{100}$$, b – percentage satisfaction with workload (0-100%)

$$T_{motiv} = \frac{c}{100}$$, c – motivation of people (0-100%)

$$T_{operator.} = T_{type} \cdot T_{size} \cdot T_{motiv}$$
$$T_{manag..} = T_{type} \cdot T_{power} \cdot T_{motiv}$$

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SALESPEOPLE'S PERCEPTION on INCENTIVE SYSTEMS:
COMPARING TAIWN and CHINA

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Abstract

An incentive system based on performances is a commonly used method to motivate salespeople and lower salespeople's intention to leave. The purpose of this study is to investigate the motivation effect of different incentives in insurance companies across different between Taiwan and China. A global insurance company that has branches in both Taiwan and China was selected as the objective and a structured questionnaire was distributed to the salespeople of this company. A total of 367 usable surveys were received back (202 samples from Kaohsiung and 165 samples from Beijing). The results show that using activity incentives can get the greatest motivation effects than the other two groups of incentives in both Taiwan and China, and money incentives is not necessarily the first one choice while salespeople choose insurance companies. The findings of this study indicate that maybe Taiwan's management environment is similar with China's, but the difference indeed exists.

Key Words: Cross-culture, Incentive, Intention to Leave, Motivation Effect, Salespeople

Introduction

China's insurance market now is the world's fastest growing market and the demand for salespeople also greatly increases. Economic reforms from 1992 (especially after the 16th National Congress of CPC in 2002) made China's insurance businesses quickly extend and attracted many foreign enterprises into this market.

Today, China's insurance industry has entered a severely competitive period. The rapidly growing market drives the insurance companies to develop and train sales force. According to the research of the Insurance Association of China in 2009, the Big Four firms (i.e., Ping An Insurance (Group) Company of China, Ltd., China Life Insurance (Group) Company, China Pacific Insurance(Group) Co., Ltd., and People's Insurance Company of China) dominate most of the salespeople in China. China Life has 780,000 salespeople, Ping An Insurance has 420,000, and China Pacific Insurance has 250,000 (Qing, 2010). Not only foreign insurance companies but also Chinese insurance enterprises need many sales forces to cultivate markets.

Although the demand for salespeople is so great, the insurance companies have been difficult to fill the gap of the manpower needs. All insurance companies in China face the same hurdle that they spend many sources to train sales force but the turnover rate of the cultivated salespeople are very high. Most insurance companies believe that to have more salespeople is better than to have fewer. What the belief omits, however, is that salespeople may feel stressed instead of motivated when thy faced huge performance requirement (Honeycutt et al., 2003).

In addition, salesperson poaching is a common way for domestic and foreign insurers in China to secure their own revenue targets. That, in turn, has increased human resource costs and directly raised the salary bar in the insurance industry (Qing, 2010). The poaching phenomenon makes high salespeople's turnover become even severe. Now China's insurance industry has led to higher than normal salespeople turnover rates. How to lower salespeople's intention to leave is important in salesperson management.

The insurance industry is a human-oriented industry, for which managers usually face the problem of high salespeople's turnover and work hard to recruit new salespeople. Some major factors lead to the high turnover rate in China's insurance industry. Firstly, insurance products are intangible and professional, and hence the sales performances are heavily dependent on salespeople's knowledge and communication skills. Salespeople must face challenges not only from managers' requirements for high sales performance but also great pressure from competitors. Secondly, salespeople' compensation are usually with low or no base salary. The kind of salary structure is not easily accepted for most people. Some trained salespeople have little willingness to evolve in the insurance industry for a long time. Finally, since recruiting and training new salespeople is costly in both time and resources, it is often safer and easier to recruit salespeople from competitors than to consider candidates who have no experiences in this industry.

An incentive system based on performances is a commonly used method to motivate salespeople and lower salespeople's intention to leave. A well-designed incentive system should be able to motivate instead of stressing salespeople (Merchant and van der Stede, 2007). Since everyone is not motivated by the same things, managers must know what kind of incentives should be carried out and how salespeople react to the used incentives. Managers need to design incentive systems

which are attractive for as many salespeople as possible.

The problem happened in China's insurance market has faced in Taiwan from 1987. After experiencing the evolution of nearly 20 years, Taiwan's insurance industry has gradually developed incentive systems to increase salespeople's job satisfaction and reduce the turnover rate. More importantly, Taiwan's insurance sales people have made the insurance business as a career to join. Referring to Taiwan's experiences is a good way to understand China's industrial ecology (Radwan, 2010), and some solutions to rescue the turnover rate may be developed.

Comparing the effectiveness of incentive systems under different sub-cultures may contribute the understanding of human resource management in salespeople within similar but different cultures. A global perspective on the motivation effects of incentives is an important research issue, and there are several reasons to question the applicability of the existing theories and practices for Greater China's salesperson management.

Firstly, cross-cultural incentive literature is fairly limited. Some studies discussing the effects of culture differences on salesperson management (e.g., Piercy, et al., 2011; Segalla et al., 2006) concern cross-national differences rather than sub-culture differences.

Secondly, countries with geographical proximity, common language roots and religion, tend to share similar values (Segalla et al., 2006), but salespeople's compensation varies not only across cultures but also within sub-cultures. Thirdly, since the selling environment is becoming rapidly international and that culturally diverse managerial decision makers are increasingly common among multinational firms, different sub-cultures may affect with each other.

The purpose of this study is to investigate the motivation effects of different incentives in insurance companies across different sub-cultures (i.e., Taiwan and China). This study tries to explore the gaps between the valence and expectancy perceptions of different incentives and the data was collected from a global insurance company that has branches in both Taiwan and China.

The framework of this study is first to review the literature and the conceptual background and logic are discussed. Next, the study design is described and the research results are presented. Finally, the implications regarding the motivation effect of incentive systems between Taiwan and China are compared.

Literature Review

A Comparison of Taiwan and China's Insurance Industries

China has experienced rapid expansion over the past decade, and therefore attracted many foreign enterprises began to participate in China's insurance market. In 2009, the total profit of China's insurance industry achieved RMB53.06 billion, a considerable rise in business value. Moreover, there were a total of 22 insurance companies with the rate of return on capital being over 8% respectively and the solvency adequacy ratio of all the foreign insurance companies stationed in China had reached above 150% (Research In China, 2010). Generally speaking, foreign insurance companies remained steady growth momentum in terms of business scale and profitability. Still, they played an important role in perfecting the main structure of China's insurance market, pushing insurance products for innovation, and expanding the insurance market in central-western regions of China.

Since China's insurance industry has entered a severely competitive period, all of the Chinese insurance companies, foreign insurance companies and Sino-foreign joint insurance ventures need many sales forces to cultivate markets. The insurance companies in China face the same hurdle that they use many resources to hire and train salespeople but the turnover rate is very high. Many trained salespeople either have no willing to stay in this industry for a long time or are poached by competitors.

Taiwan's insurance industry experiences the similar development from government regulation to competition. In order to realize the finance liberalization and internationalization policy, Taiwan began to open its insurance market to foreign insurance companies from 1987 and then to allow the new establishment of local insurance companies from 1992. In the late 90s, the insurance market in Taiwan was gradually becoming saturated, and the rapid development of this market led to the urgent need for sales force. At that time, the high employee turnover rate was an important issue in Taiwan insurance industry.

While China is opening its financial market after joining WTO, Taiwan experience has significant influence on the development of China's insurance industry. Many Taiwan's financial enterprises try to set up offices and a lot of talent and know-how developed in Taiwan were moved to the Chinese Market. China's insurance laws and regulations were also referred to Taiwan's. Even the success of Ping An Insurance, a Shenzhen-based company that is the industry's benchmark for service and customer-value creation, also learned and applied best practices from the Taiwan market. The impetus for borrowing Taiwanese insurance talent and regulation goes beyond common language to the fact that customer buying behavior is similar in both Taiwan and China (Radwan, 2010).

Incentive System

Incentive systems can be viewed as organizational resources for aligning salespeople's attitude and behavior with organization objectives (Brown et al., 2005). Hay Group survey shows that the majority of the employees who consider leaving his organization in two years are salespeople (Jensen et al., 2007). The main factor leading to high intention to leave is poor career development and unstable financial compensation. In order to increase salespeople's intention to stay, managers must consider how to use well-designed incentives, which can motivate sales force to pursue specific and challenging goals, to benefit the organization. Existing theories such as expectancy theory by Vroom (1964) or goal-setting theory by Locke (1968) point out that a well-designed incentive system can lead to positive attitude, along with greater effort and enhanced performances. The structure of incentive systems determines not only the salespeople's perception of the probability of reward for their performances, but also their motivation to achieve organization objectives.

Generally, incentives could be divided into three groups, material, social, and activity (Greenberg and Liebman, 1990). *Material Incentives* (MI) include compensation, bonus, or other nonmonetary rewards (such as birthday/holiday gift, insurance, health examination, trips, and so on), which can satisfy salespeople's physical needs. *Social Incentives* (SI), which operate on the interpersonal level to satisfy employee's membership needs, include identification with the organization or recognition by peers, customers, and competitors. *Activity Incentives* (AI) are those reward related to possibilities of advancing in the organization and personal development such as promotion, opportunities of getting education and training, policies of management by objective, and

so on. For salespeople with a strong need for accomplishment, AI means opportunities rather than challenges.

The effectiveness of a company's incentives is based on how well it capitalizes on the motivational needs of its salespeople, and if salespeople are driven by any one or a combination of the incentives (Greenberg and Liebman, 1990). Among various incentives, financial compensation is widely acknowledged as a key driver of sales force motivation. Past studies show that the most common form of salespeople compensation plans combine a wage with quota-based commission or bonus plans based on company goals (Alexander Group, 2004; Joseph and Kalwani, 1998). Usually, salespeople assess wage raises more than other performance rewards such as promotion opportunities, fringe benefits, and recognition awards (Chonko et al., 1992; Cron et al., 1988). However, this fact does not mean that salespeople expect to receive the highest monetary award rather than they expect a fair reward system reflecting their performances (Livingstone et al., 1995). Social and activity incentives that reward salespeople for their individual or team performance relative to others are usually effective (Brown et al., 2005).

As to how to measure the effect power of incentives, expectancy theory states that motivation effect (M) is dependent on valence (V) and expectancy (E) (i.e., $M = V \times E$) (Porter and Lawler, 1968). Valence refers to all possible emotional orientations toward the outcome (or reward), and it is interpreted as the attractiveness, desirability, or anticipated satisfaction with outcomes (Eerde and Thierry, 1996). In other words, an incentive is positively valent if an employee would prefer having it to not having it. Expectancy is defined as "a subjective assessment of the degree to which an employee's effort actually correlates with performance" (Eerde and Thierry, 1996). This assessment is generally based on an employee's past experience, self confidence, and the perceived difficulty of the performance standard or goal.

The Effects of Subcultures On Incentive Preferences Between Taiwan and China

As to staffs' incentive effects, most of the empirical studies show material incentive such as salary and bonuses is preferred than the other two types of incentives. Usually, salary level has significant effect on employees' job performance, no matter for the Taiwanese or Chinese employees (Fisher and Yuan, 1998; Yen, 2006).

Although Taiwan and Mainland China have a shared culture and shared ethnic origin, the more than fifty-year separation leads to the fact that the cross-strait people actually have many differences among ideas, concepts, values, and cognition. Especially, employees across the Taiwan Strait have perceived differences in thinking, values, and the views on work (Lu, 1997).

Values are the premise to understand individuals' behavior, attitude and motivation motive and work values is extended from the meaning of values (Kinnane and Gaubinger, 1963). Work values lead to people's interpretation on work meaning and preference for financial reward, loyal, social relationships, social status, and self-realization (Robbins, 1998). Related literature conducted in Taiwan and Mainland China found that the employees across the Taiwan Strait have obvious differences in work values (Yen, 2006). Therefore, this study supposes that the salespeople between Taiwan and China prefer different incentives and wants to explore what the differences are.

Research Methods

Procedure and Sample

In order to minimize the effects of other exogenous factors (e.g., company size or incentive contents), a global insurance company that has branches in both Taiwan and China was selected as the objective and the research data was collected from this company. It was deemed important to the sample company that use similar incentives in Taiwan and China in order to increase sample validity in the study. The managers of two branches separately in Kaohsiung (Taiwan) and Beijing (China) of the global insurance company were contacted and with their agreement on participation, we got around a sample of 410 salespeople. The questionnaires with a covering letter explaining the importance of the study were distributed to the two branches. A total of 403 surveys were received back and 367 surveys were deemed usable (202 samples from Kaohsiung and 165 samples from Beijing), for a response rate of 89.57%.

Measures

The questionnaire contained items related to subject characteristics and the incentive system. All scales employed were developed from existing literature. The structured questionnaire was translated back and forward by two different bilingual researches. Translated questionnaire were reviewed by an insurance manager and an insurance salesperson. The questionnaire was then adopted with minor modifications as per local requirements of Taiwan and China.

A pilot test of the questionnaire was tested on twenty randomly selected salespeople of an insurance branch in Kaohsiung. The amount of time required to complete the entire questionnaire by the respondents was also measured. The survey was then evaluated for reliability and validity according to the understanding of the

questionnaire's directions. If there were critical or ambiguous questions, they were modified or replaced.

Incentive system.

This study listed the usually used *incentive* items through referring to past research in Taiwan and interviewing some sales managers in insurance companies. Based on Greenberg and Liebman's (1990) framework, all the incentive items are classified into three groups: MI, SI, and AI. The twelve items, representing MI, are "bonus for sales contests", "team performance bonus", "individual performance bonus", "holiday bonus", "year-end bonus", "birthday/holiday gift", "reward for sales contests", "insurance (group insurance or other social insurance)", "incentive tour", "retirement schemes", "regular health examination", "preferential loan rates". The five items used to measure SI include "to become one of the outstanding team members or club members", "be offered praise in public (be awarded medals or pennants)", "get the manager's specific verbal compliments", "be announced accomplishment in the company publication or website", "attend the annual elite conference". The five items representing AI are "team performance contest", "individual performance contest", "job promotion system", "complete education/training system", "management-by-objectives system".

Further, with Porter and Lawler's (1968) formula, $M = V \times E$, the motivation effect was calculated by multiplying the values obtained for valence and expectancy. Referring to Eerde and Thierry's (1996) operationalization, valence was evaluated as the attractiveness of all the incentives and expectancy was measured as the perceived possibility to get these incentives. Responses were made on 5-point scales (1 = strongly disagree to 5 = strongly agree).

Demographic characteristics.

The respondents provided information on their gender, age, education, sales experience with present employer (job tenure), and past sales experience in the insurance industry. This study chose these demographic variables as the candidates of control variables since they have been proven to be related to salespeople's perception of incentives and turnover intention. For example, men were found to have higher levels of organizational commitment in a Chinese sample (Chen and Francesco, 2000) and individuals' organizational tenure and occupational tenure can simultaneously affect their organizational commitment (Chang et al., 2007). Individuals with higher education level had lower organizational commitment and greater turnover intentions because they had more job opportunities (Mathieu and Zajac, 1990). on the other hand, older individuals and those with long tenure within an organization had less desires to change jobs and fewer job opportunities (Arnold and Feldman, 1982).

The characteristics of the sample are provided in Table 1. As shown in this table, more than half of the respondents (54%) were male and most did not have previous sales experience in the insurance industry (85%). Over two-thirds of the salespeople had been with their current employers for over one year (73%). As to the sales experience in the insurance industry, it was significantly different between Taiwan and China. Ninety-four percent of Taiwan's subjects did not work in other insurance companies, but over than half of the Chinese subjects had work experiences in other insurance companies. This structure reflects the fact that the majority of salespeople in Chinese insurance companies are poached from competitors.

Results

Prior to compare the incentive systems between Taiwan and China, a MANOVA was performed to ascertain whether the two groups of subjects differed in their perceptions of motivation effects ($M = V \times E$). The results showed that, regardless of subjects' gender, age, education, tenure in present organization, and living city (i.e., Beijing and Kaohsiung), subjects' perceptions of the motivation effects did not differ. Respondents in this study had a neutral perception of the incentive system.

The Presence of the Valence And Expectancy Perceptions

The structure of the observed incentive systems between Taiwan and China shows in Figure 1 and the perception patterns between the two groups of subjects are quite similar. The similarity is able to be explained as that the two branches' management systems have similar incentive systems and company goals since management process in different countries are becoming more similar (Piercy et al., 2011).

Table 2. lists means of the valence, expectancy, and motivation for the three incentive groups in Taiwan and China. As can be seen, both the valence and expectancy perceptions in China are significantly lower than in Taiwan in the corresponding incentive groups. Therefore, the motivation effect in China is significantly lower than in Taiwan. As to separately compare the motivation effects of the three incentive groups, the motivation effect of SI is the lowest and the effect of AI is the highest.

Compare the Gaps Between the Valence and Expectancy Perceptions

Paired sample t-test was used to compare the perceptions between valence and expectancy perceptions for the three incentive groups and the results appear in Table

Table 1. Demographic Characteristics of the Samples

Characteristics	Percentage		
	Taiwan (n=202)	China (n=165)	Total (n=367)
Gender			
Male	49%	43%	46%
Female	50%	57%	54%
Age			
< 25	25%	29%	27%
25-30	29%	22%	26%
31-35	21%	16%	19%
36-40	12%	18%	15%
41-45	10%	9%	10%
> 45	3%	6%	4%
Education			
≦Junior high school	0%	5%	2%
Senior high school	28%	28%	28%
Some college	27%	35%	30%
Bachelor degree	41%	30%	36%
≧Graduate degree	4%	3%	3%
Sales experience with present employer			
< 1year	25%	30%	27%
1-3 years	32%	32%	32%
4-6 years	11%	21%	16%
7-9 years	16%	13%	15%
> 10 years	16%	3%	10%
Having sales experience in other insurance companies			
Yes	6%	59%	30%
No	94%	41%	70%

3. There are some interesting findings. Firstly, no matter in Taiwan or China, the valence of MI is significantly higher than the expectancy of MI and so is for AI. Secondly, although the motivation effect of SI is the lowest in both Taiwan and China, no significant gap exists between valence and expectancy of SI. Finally, in China, gap between valence and expectancy of MI was largest. Salespeople in China feel that although the attractiveness of MI is similar with AI, the possibility of getting AI is much higher than MI.

Compare the Motivation Effects Among the Three Incentives

The results of compare the motivation effects among the three incentives appear in Table 4. In Taiwan, it was significant that AI(V) > MI(V) > SI(V) and AI(E) was higher than MI(E) or SI(E). There was no significant difference only between MI(E) and SI(E). Different from the other two types of incentives, the expectancy of SI is slightly higher than the valence of SI in Taiwan. In China, the valence perception of SI is the lowest and the expectancy perception of AI is the highest, and so is for the valence perception in Taiwan.

Discussion

This study explores the multi-dimensions of salesperson's incentive systems. We discuss our findings and managerial implications in the following.

First, the demographic characteristics of salespeople in Taiwan and China are similar except the sales experience in other insurance companies. The majority of salespeople in China are poached from competitors but the majority of salespeople in Taiwan are freshman. Therefore, the motivation effect in China is significantly lower than in Taiwan. At the corporate level, the design of incentives must meet two criteria: (1).they must reinforce each of the motivational needs; and (2).they must reward activities and behavior that support reaching the business goals (Greenberg and Liebman, 1990). In other words, companies must address their salespeople's desire for personal development. Maybe Taiwan's management environment is similar with China's, but the difference indeed exists. This is why the motivation effects of the same incentive system on Taiwan and China's salespeople are similar but indeed different.

Secondly, both Taiwan and China's salespeople have high valuations of AI in terms of valence or expectancy, and, therefore, using AI can get good motivation effects to satisfy salespeople's needs of self-actualization. This finding is unexpected and is different from past research. It may reflect the current operating situation that insurance companies in Taiwan and China use similar activity incentives, which almost come from the U.S., to try satisfy salespeople's needs of self-actualization in Maslow's need-hierarchy theory.

Past research has shown that a desire to be dominant or to climb the social status hierarchy is associated with a high valence

for recognition and desiring approval from superiors (Murphy, 2004). The heightened attractiveness of these rewards makes goal attainment particularly important for salespeople with high status aspiration and activity incentives has the heightened attractiveness to satisfy this group of salespeople. Since the motivation effect of activity incentive is the highest in Taiwan and China, salespeople within the two sub-cultures fairly emphasize their social status hierarchy.

Thirdly, China's insurance market is getting mature, like Taiwan's insurance market, and MI is not necessarily the first one choice while salespeople choose insurance companies. Perhaps because the provision of financial rewards has formed customary practices, the salespeople generally believed that the upgrading possibility in the future is limited. Another reason is that compensation packages are only a subset of the broader class of MI and salespeople are not satisfied with other incentives belonged into non-monetary rewards. So the motivation effect of MI is not as effective as the results shown in previous studies.

Finally, the key contribution of this study is to answer the question "what" as no studies have tried to explore a theoretical studies for practical operations of incentive systems under two sub-cultures. The results indicate that the provision of incentives enhances the image of the organization to outsiders that what its goals is and what it really want to give its salespeople. Give that incentive systems similarly provided by every organization, firms that provide incentives matched salespeople's needs are perceived to be distinctive. This perception will enhance employees' level of identification with their organization, resulting in positive attitudes.

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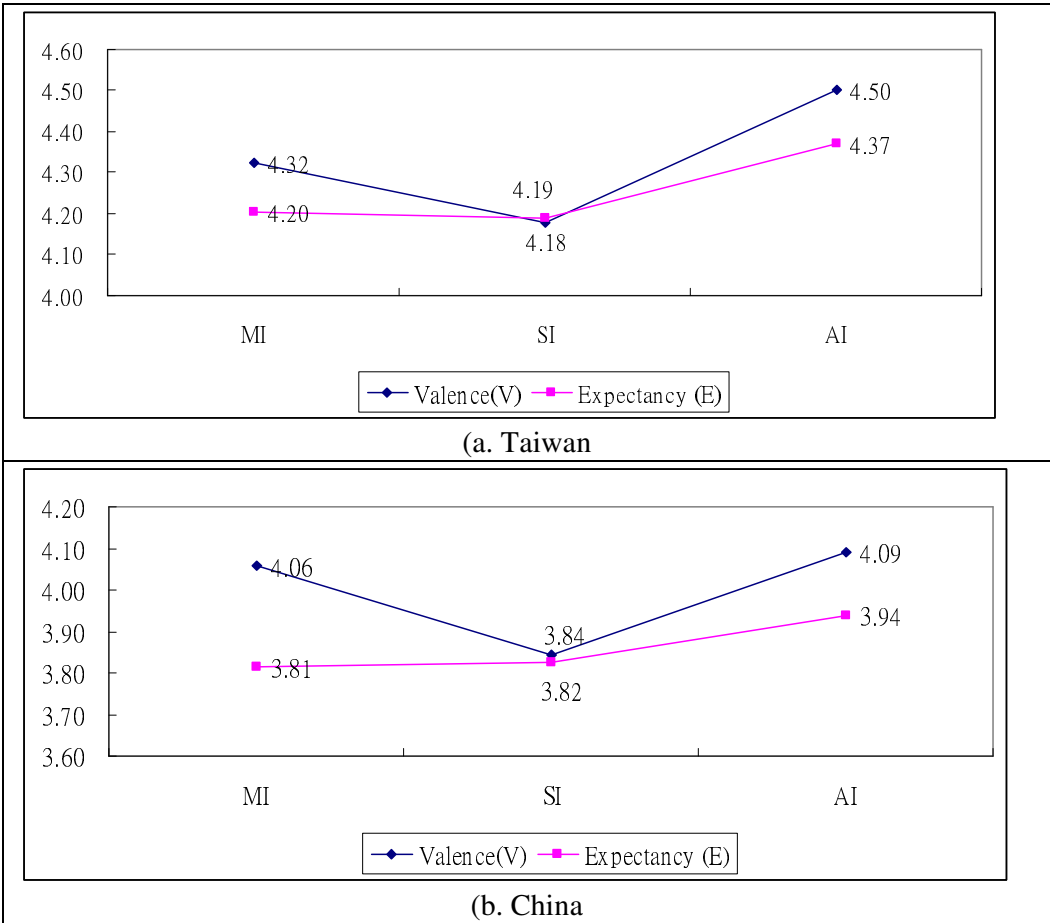
(a. Taiwan

(b. China

Figure 1. The Incentive Systems Between Taiwan and China

Table 2. Means of Three Incentives in Taiwan and China

Area	China	Taiwan	t-value
MI (V)	4.06	4.32	4.14*
SI (V)	3.84	4.18	4.47*
AI (V)	4.09	4.50	6.20*
MI (E)	3.81	4.20	5.96*
SI (E)	3.82	4.19	5.10*
AI (E)	3.94	4.37	5.93*
MI (M)	15.76	18.27	5.69*
SI (M)	15.09	17.71	5.26*
AI (M)	16.44	19.86	7.00*

*: significance at 0.05 level.

Table 3. Comparison of the Valence and Expectancy Perceptions

Item difference	Taiwan	China
MI(V) - MI(E)	3.01*	4.89*
SI(V) - SI(E)	-0.25	0.37
AI(V)- AI(E)	3.60*	2.57*

*: significance at 0.05 level.

Table 4. Comparison of the Motivation Effects Among the Three Incentives

Item difference	Taiwan	China
MI(V) - SI(V)	3.91*	4.97*
MI(V) - AI(V)	-7.36*	-0.78
SI(V) - AI(V)	-9.20*	-5.95*
MI(E) - SI(E)	0.52	-0.50
MI(E) - AI(E)	-6.15*	-3.69*
SI(E) - AI(E)	-6.30*	-4.06*
MI(M) - SI(M)	2.59*	2.79*
MI(M) - AI(M)	-8.73*	-2.84*
SI(M) - AI(M)	-10.39*	-7.05*

*: significance at 0.05 level.

EFFECTS of BUYER INFLUENCE AND GREEN SUPPLY-CHAIN READINESS ON ENVIRONMENTAL PERFORMANCE: THE MEDIATING ROLE OF ENVIRONMENTAL COLLABORATION

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Abstract

The aim of this study is to examine the effect of buyer influence and green supply-chain (GSC) readiness on environmental performance, and the mediating role of environmental collaboration. A questionnaire survey was carried out among manufacturers in the electrical and electronics industry in Taiwan. The results of this study suggest that both GSC readiness and environmental collaboration significantly and positively affect environmental performance, and confirm the mediating effect of environmental collaboration. This paper also provides managerial implications and offers suggestions for future research, based on the findings of the study.

Key words: Buyer influence, GSC readiness, Environmental collaboration, Environmental
                    performance, Electrical and electronics industry
                    Introduction

As countries worldwide become more aware of the importance of environmental protection, adopting robust environmental management methods is both critical and indispensable for companies that want to gain a competitive advantage. Many European and North American countries have already promulgated numerous environmental protection laws and regulations, such as the Restriction of Hazardous Substances (RoHS), Waste Electrical and Electronic Equipment (WEEE), Eco-Design Requirements for Energy-using Products (EuP), and other directives for environmental protection, which stipulate materials, components, and manufacturing methods that should be used for electrical and electronic products. Many major international brand companies have started to request their original equipment and design manufacturing (OEM/ODM) manufacturers to implement Green Supply Chain Management (GSCM) because of these mandatory environmental requirements.

Taiwan is a global manufacturing center for electrical and electronic products. Because of the cross-tier ripple and indirect effects of the above-mentioned laws and regulations, Taiwanese OEM/ODM manufacturers must enhance their environmental management capacity and engage in environmental collaboration with upstream suppliers to produce green products that conform to these environmental laws and regulations (Koh et al., 2012). According to institutional theory

and the resource-based view, external buyer influence and internal green supply-chain (GSC) readiness can increase the willingness of manufacturers to adopt GSCM (Lee, 2008). Environmental collaboration with suppliers can also boost manufacturing performance (Vachon & Klassen, 2008). Nonetheless, previous studies have rarely explored the effects of buyer influence, GSC readiness, and environmental collaboration on environmental performance at the same time. This study carried out an empirical analysis to fill this research gap and proposes a theoretical framework.

Literature Review and Hypotheses

Environmental pollution has become more serious over the past few years and companies are being encouraged to improve their environmental performance and achieve sustainable development (Gimenez et al., 2012). For manufacturers, engaging in GSCM is critical for improving their performance. According to Zhu et al. (2004), GSCM comprises green purchasing, supply chain integration, and reverse logistics. They proposed that the focus of environmental performance be placed on reducing pollutant emissions and improving environmental conditions. Rao (2002) and Zhu & Sarkis (2007) pointed out that environmental performance is a key GSCM performance indicator.

Environmental standards, such as WEEE, RoHS, and EuP, stipulate regulations on waste treatment, hazardous substance prohibition, and ecological design. International brand companies are requesting their OEM/ODM manufacturers to adopt GSCM to improve green management performance and generate green products that comply with mandatory environmental laws and regulations (Koh et al., 2012). According to institutional theory, the operating strategies of manufacturers are influenced by their stakeholders (DiMaggio & Powell, 1983), and this influence is a significant source of institutional pressure that guides behavior (North, 1990). Delmas & Toffel (2004) pointed out that the attention of buyers to environmental issues prompts manufacturers to engage in environmental management activities, which can enhance business performance (Darnall et al., 2008).

From the perspective of GSCM, Lee (2008) indicated that requests from buyers for GSCM increase the willingness of manufacturers to implement GSC practices, which can improve the environmental performance of manufacturers (Zhu & Sarkis, 2004; Zhu & Sarkis, 2007). As a result, researchers have suggested that environmental requests from international brand companies improve the environmental performance of Taiwanese OEM/ ODM manufacturers. We therefore propose hypothesis H1a:

H1a: Buyer influence has a positive effect on environmental performance.

Aside from buyer influence, GSC readiness of manufacturers is a critical factor that influences environmental performance (Zhu & Sarkis, 2007; Lee, 2008). GSC readiness is a composite of internal resources that are advantageous for promoting GSC practices. The composite can include environmental awareness of managers, an environmental management system, financial resources, and human resources (Lee, 2008). According to the resource-based view, companies with sufficient resources can easily establish dynamic capabilities for responding quickly to industrial changes (Eisenhardt & Martin, 2000; Teece et al., 1997). To sustain their competitive advantage, these companies adopt proactive environmental strategies to respond to stakeholders who emphasize environmental issues (Sharma et al., 1999; Sarkis et al., 2010).

Lee (2008) determined that GSC readiness increases the willingness of companies to embrace GSC practices. Darnall et al. (2008) suggested that the resources and capabilities of a company facilitate the establishment of an environmental management system and improve business performance. Gimenez et al. (2012) suggested that internal environmental action programs can enhance the environmental performance of companies. In line with these findings, the

second hypothesis of this study, H1b, assumes that GSC readiness of manufacturers facilitates improved environmental performance.

H1b: GSC readiness positively influences environmental performance.

Raw materials, components, semi-products, and end products are regulated under RoHS, WEEE, and other environmental protection directives. As a result, these directives exert cross-tier ripple effects on the upstream and downstream GSC (Koh et al., 2012). Downstream brand companies request their OEM/ODM manufacturers to comply with these environmental regulations, and they also demand that OEM/ODM manufacturers manage their own upstream suppliers. Consequently, manufacturers recognize that the environmental management capacities of their suppliers affect their own operating performance. They also recognize the necessity of actively adopting supplier management to sustain a competitive advantage (Rao, 2002). Vachon & Klassen (2006) proposed that manufacturers use an environmental collaboration approach to attain this goal. For example, manufacturers can either draw up environmental solution projects with their suppliers, or they can directly intervene in the environmental management activities of their suppliers, to improve environmental performance. Researchers have suggested that buyer influence positively

affects environmental collaboration, which is the basis for hypothesis H2a.

H2a: Buyer influence positively affects environmental collaboration.

In addition, if manufacturers want to be directly involved in the development activities of suppliers, manufacturers must contribute enough resources to jointly design their green products, share environmental management knowledge, and reduce waste materials generated from their operations (Vachon & Klassen, 2006). For manufacturers that are short of resources, promoting external GSC practices is relatively difficult (Gonzalez-Torre et al., 2010). Conversely, companies with sufficient resources and professional knowledge can assist their suppliers to implement environmental management (Zhu et al., 2008; Wu et al., 2012).This can contribute to an increase in the willingness of the supplier to collaborate with the manufacturer (Lee, 2008; Gold et al., 2010). Considering these research findings, this study suggests that GSC readiness of OEM/ODM manufacturers promotes environmental protection, as outlined in hypothesis H2b.

H2b: GSC readiness positively affects environmental collaboration.

Environmental collaboration involves knowledge-sharing and cooperation between a manufacturer and its suppliers. Therefore, environmental collabo-

ration requires inter-organizational practices (Vachon & Klassen, 2006), which are social and complex (Shi et al., 2012). Competitors that do not have the organizational resources required to implement GSCM cannot easily imitate these practices. Manufacturers that have sufficient capacity can therefore strengthen their competitive advantage (Gold et al., 2010; Vachon & Klassen, 2008). Rao (2002) pointed out that helping suppliers to implement environmental management practices is beneficial for the environmental performance of the manufacturer. Zhu & Sarkis (2007) noted that if manufacturers and their suppliers can collaborate on green purchasing, the environmental performance of the manufacturers is improved.

The empirical study of Vachon & Klassen (2008) showed that environmental collaboration can enhance manufacturing performance. Gimenez et al. (2012) also suggested that cooperating with suppliers on environmental issues enabled them to improve their environmental performance. Considering both research findings, this study argues that environmental collaboration improves environmental performance and acts as a mediator between buyer influence, GSC readiness, and environmental performance. Therefore, we developed hypotheses *H3*, *H4a*, and *H4b*.

H3: Environmental collaboration positively affects environmental performance.

H4a: Environmental collaboration mediates the relationship between buyer influence and environmental performance.

H4b: Environmental collaboration mediates the relationship between GSC readiness and environmental performance.

Research Design and Methods

Research Framework

The theoretical framework was developed based on the research motivation and hypotheses, and is shown in Figure 1.

Instrumentation

Five constructs were applied in this study. Buyer influence (four items) and GSC readiness (six items) were adapted from Lee (2008). The former included requesting manufacturers to implement GSCM practices and providing manufacturers with environment training. The latter emphasized on GSC resources within manufacturers such as managers' environmental awareness, financial reserves and internal communication of environmental information. Environmental collaboration (five items) was

modified from Vachon and Klassen (2006) which involved cooperation with suppliers to fulfill environmental management goals jointly and to avoid environmental damage collectively. Environmental performance (six items) was defined according to Zhu and Sarkis (2004) which focused on reduction
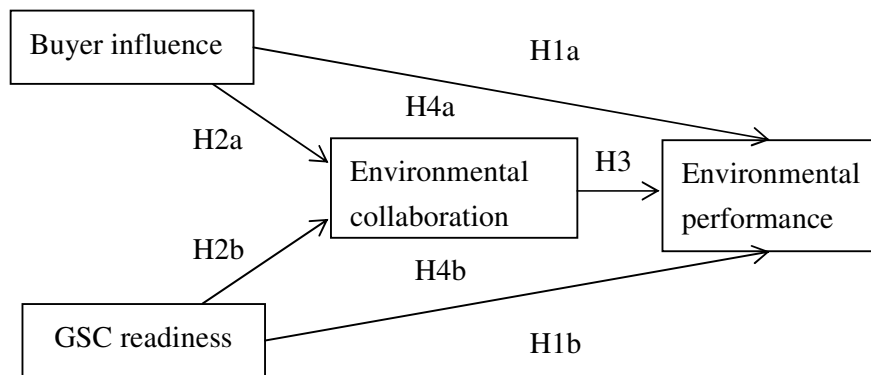
Figure 1   Theoretical framework

of waste and hazardous materials. A 1- to 7-point Likert scale was used for rating the items.

Data Collection and Analysis

Manufacturers in the electrical and electronics industry in Taiwan were sampled for this study. Questionnaires were mailed to procurement and quality control managers at sampled companies. Among the 325 responses, 72 were invalid and were removed, leaving the study with 253 valid questionnaires. Next, the validity and reliability of each measured scale was tested. For factorial analysis, the eigenvalues of factors of every construct were greater than 1 and the factor loading of each item was greater than 0.5. Moreover,

the accumulated variance of every construct scale was greater than 50%. Collectively, every construct qualified the construct validity criteria. In addition, the results of a reliability analysis showed that the Cronbach's α of every factor was greater than 0.7, indicating that all constructs were reliable (Nunnally, 1978).

Research Results

Multiple regression analysis and hierarchical regression were used to examine the hypotheses of this study. The analytical results are presented in Table 1. The maximum value of the variance inflation factor was 2.878 (<10), and therefore, collinearity was not an issue. As for Hypotheses *H2a* and *H2b*, both buyer influ-

ence and GSC readiness had significantly positive effects on environmental collaboration ($\beta = 0.494$, $p = .000$; $\beta = 0.228$, $p = .002$), and therefore, *H2a* and *H2b* were supported. As shown in Model 1, buyer influence had no significant effect on environmental performance ($\beta = 0.001$, $p = 0.987$), and therefore, *H1a* was rejected.

GSC readiness had a significantly positive effect on environmental performance ($\beta = 0.615$, $p = 0.000$), and therefore, *H1b* was supported. In Model 2, environmental collaboration demonstrated a significantly positive effect on environmental performance ($\beta = 0.511$, $p = 0.000$), and therefore, *H3* was supported. In Model 3, the regression coefficient for buyer influence was insignificant ($\beta = -0.127$, $p = 0.124$) and the regression coefficients for GSC readiness and environmental collaboration were positively significant ($\beta = 0.555$, $p = .000$; $\beta = 0.259$, $p = .000$).

According to the results obtained from analyzing Model 1, Model 2, and Model 3, as well as the testing criteria of the mediating effect proposed by Shrout & Bolger (2002), environmental collaboration played a full mediating role between buyer influence and environmental performance, even though buyer influence did not directly and significantly affect environmental performance. Therefore, hypothesis *H4a* was supported. In addition, the regression coefficients for environmental collaboration were larger in

Model 2 as compared to Model 3 (0.511 > 0.259). Environmental collaboration had a partial mediating effect on the relationship between GSC readiness and environmental performance, and therefore, *H4b* was supported. Figure 2 shows the results of all hypotheses.

Conclusion and Discussion

By considering both buyer influence and GSC readiness, shows that buyer influence does not significantly and directly affect environmental performance. Buyer influence and GSC readiness can represent market pressure and company resources, respectively. Clemens & Douglas (2006) stated that institutional pressure and sufficient company resources can both act positively on environmental management. Nonetheless, sufficient company resources may decrease the effect of institutional pressure, and as a result, it is necessary to analyze the effect of institutional pressure and company resources concurrently (Sarkis et al., 2011).

As for environmental management performance, this study demonstrates that GSC readiness of manufacturers is more dominant and powerful than buyer influence. In other words, to pursue sustainable development, manufacturers, in the long run, should accumulate GSCM resources and capabilities, including professional knowledge of environmental management, manager support, a solid environmental management system, and fi-

nancial and human resources. These empirical findings not only fill the gap identified in previous research, but also add insight for future research.

In addition, this study demonstrates that environmental collaboration positively affects environmental performance,

Table 1. Hierarchical regression analysis with buyer influence/GSC readiness
/environmental collaboration on environmental performance

Independent variable/Mediator	Mediator Environmental collaboration	Dependent variable Environmental performance			Variance inflation factor
		Model 1	Model 2	Model 3	
Buyer influence	0.494***	0.001		-0.127	2.878
GSC readiness	0.228**	0.615***		0.555***	2.517
Environmental collaboration			0.511***	0.259***	1.881
F	110.112	76.260	88.858	58.807	
P	0.000	0.000	0.000	0.000	
Adjusted R^2	0.464	0.374	0.259	0.408	
Durbin-Watson	2.055	1.881	1.830	1.852	

*for p<0.05, **for p<0.01, ***for p<0.001
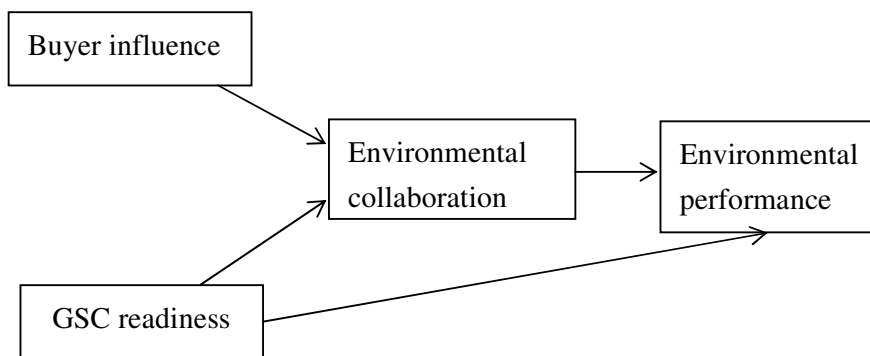
Figure 2. Research Results

and environmental collaboration exerts a mediating effect. The results of the study show that environmental collaboration acts as a mediator between buyer influence and environmental performance. This finding indicates that international brand companies indirectly improve environmental performance of their manufacturers by asking manufacturers to manage their suppliers. The study also reveals a partial mediating effect of environmental collaboration on the relationship between GSC readiness and environmental performance. This finding implies that if manufacturers with sufficient resources carry out environmental collaboration with their suppliers, their environmental performance is enhanced. These findings, which are consistent with those of Koh et al. (2012), provide an empirical example of cross-tier ripple effects and stress the importance of GSCM on environmental performance (Gimenez et al., 2012). Other researchers could use the findings of this study as a reference for future studies.

Finally, this study reports some research limitations. First, because buyer influence represents market pressure only, future studies could include and analyze the effect of other types of institutional pressure. Secondly, in this study, environmental performance was the dependent variable, and future studies could include other types of performance, such as economic or social performance. Thirdly, the sampling subjects were manufacturers in the electrical and electronics industry in Taiwan. Future studies could investigate companies from other industries to better understand the mediating effect of environmental collaboration.

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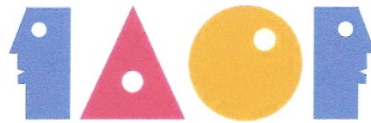
THE STUDY OF DECISION-MAKING PARAMETERS SELECTION MODEL (DMPSM) IN PROJECTION MANAGEMENT

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Abstract

When enterprise management problem occurs or the organization needs to innovate, it is often necessary to set up project management units in order to find the optimal solution. Companies face new challenges everyday due to changing business environment. Hence, in order to effectively lead a company through rough times, one must also be open minded and adoptable to new changes. Furthermore, it is detrimental that all decision makers have the most up-to-date information about the issues at hand when making decisions. The decision making parameters selection model (DMPSM) which I am going to discuss in this paper combines the strength of TRIZ theory and the DEA model to allow a decision maker to make prompt and accurate decisions. The DEA common weights model is used to prioritize known parameters such as price, quality, after sale service…etc. The TRIZ theory is used to figure out the corresponding solving rules associated with the above parameters.

By utilizing the Decision-making parameter selection model (DMPSM), a decision maker becomes more efficient and effective as DMPSM helps reduce the time it takes to search for solutions. This is only possible with DMPSM's ability to prioritize the know parameters associated with the issue at hand.

Key Words: TRIZ (Teoriya Reshniya Izobretatelskikh Zadatch; Theory of Inventive Problem Solving; TIPS), Data Envelopment Analysis (DEA), Common Weight Model (CWM), Decision-making Parameter Selection Model (DMPSM)

Introduction

International economic development changes rapidly so that the business management problems are becoming more complex. So we cannot just stick to one single rule or merely rely on the previous success experiences to solve these complex problems effectively.

The frequently-used relevant decision-making analysis methods are described briefly as follows.

(1) Brainstorming (Osborn, 1967): Its advantage is to set relevant groups to conduct brainstorming solutions at any time. However, it is a non-structured way of thinking method, often failing to converge and being time-consumption.

(2) the Delphi method (Turoff,1970), although it has the incorporated expert opinion, its process is time-consuming. Sometimes needs the method to be conjunct with other methods

(3) AHP (Analytic Hierarchy Process) (Saaty, 1980) is a decision-making method of measurement through pair-wise comparisons and relies on the weights from experts to obtain priority scales. Its basic concept is to construct a matrix so as to express the relative values of a set of attributes. The consistency of pair-wise matrix requires further verification.

(4) ANP (Analytic Network Process) (Satty,1996) is a generalized application of the AHP. ANP concedes complex interrelationships in different decision levels and attributes

(5)TOPSIS (Technique for Order Preference by Similarity to Ideal Solution)

(Hwang, 1981), the basic principle of the TOPSIS method is that chosen alternative should have the "shortest distance" from the "positive ideal solution" and the "farthest distance" from the "negative ideal solution". The abovementioned decision-making analysis approach, just proposed how to choose the parameter ordering, without further put forward these parameters (factors) that corresponds to the reference solutions.

In order to improve potential issues of abovementioned decision-making analysis methods, we proposed the "decision-making parameter selection model (DMPSM)" combining TRIZ with Data envelopment analysis (DEA). TRIZ and DEA are briefly described as follows: TRIZ is the acronym for the Russian "Izobretatalskikh Zadatch of the Teoriya Reshniya," which can be translated into English as "The Theory of Inventive Problem Solving". This theory was proposed by Genrich Altshuller(1977), consisting of the 40 Inventive principles, the Contradition matrix, Substance field resources, the Rule of evolution, and the Ideal Final Result. TRIZ has been widely used in emgineering field, and in resent years it also starts to be applied in business management.

Mann (2000) thought that TRIZ had provided a strong framework and systematic approach to inventions, and that the method could also solve business and organizational management related issues, and that it can combined with other method to solve management problem. Prim and Trabasso(2005) pointed out that the TRIZ theory could be easily applied to project management, especially in the recommendation and implemention phase whose the main goal is to reduce or eliminate the barriers to innovate.

The Data Envelopment Analysis (DEA) mainly deals with linear programming with the multi-input and multi-output variablea to obtain the relative efficiency score of the Decision making Units (DMUs) without making prior assumption of any production function. These efficiency units could from an efficient frontier. If the DMU are not located on the efficient frontier, they are inefficiency units as there is a gap in their efficiency score, ranging from 0 to 1. They could further be improved by using of their relative weights.

The concept of efficiency measurement was first proposed by Farrell, M. J. in 1957. Charnes et al. (1978) first proposed the CCR model to assess the relative efficiencies of multi-input and multi-output production units, and then the programming measure Constant Returns to Scale (CRS) was proposed. Banker et al. (1984) further proposed the BCC model as the Variable Returns to Scale (VRS) approach. In addition to the above two basic models, CCR and BCC, in recent decades, numerous researchers have proposed many extension models for different purposes and needs. We will not describe the extensive ones here since the relevant DEA papers are available to refer.

This study proposed to combine TRIZ with DEA, and developing a new decision-making Parameters selection model (DMPSM). The main advantage of this model is that it can effectively and objectively process the information by construction-thinking, and obtain the most favorable parameters and its corresponding solutions. In addition, the main feature of this model is able to correct the weights of former experts parameters score continuously. This model not only shortens the decision-making time to get the appropriate parameters ranking but also obtains its corresponding solution rules. The rest of the paper is organized as follows: Section 2 describes how to combine DEA with TRIZ to establish the decision-making parameter selection model (DMPSM). Section 3 is case study by use of smart phone, and Section 4 is the conclusion that this model could effectively find out the main parameter priority and its corresponding solution rules

The Decision-making Parameter Selection Model

This study proposes the new decision making parameter selection model and its approach implement procedure is as follows.

(1) Definition of the problem and parameter selection: the affected factors of the problem was surveyed through market investigation, and questionnaire was utilized to a group of experts and then the list of the parameters ranking was obtained with the Likert scale score to obtain, as shown in Table 1,2,3,4.

(2) Determining the main parameter contradiction matrix and its corresponding Inventive Principle rules: the TRIZ contradiction matrix through the parameter weights ranking that decided by the DEA common weights model, as shown in Table 5. The DEA common weights model (Bao, 2008) is as equation (1). Combine the 40 rules principles to find out the main priority rules, as shown in Table 6.

Min $\sum S_k$
St. $\sum \mu_i y_{ik} - \sum v_j y_{jk} + s_k = 0$
$L_i \leq \mu_i / \mu_1 \leq U_i$ $\qquad$ (1)
$\sum v_j = 1$
i = 1, 2,……,m
k = 1, 2,……,n
j = 1, 2,……,r (r=1)

Where S_k is slack of the DMU_k.
$L_i \leq \mu_i / \mu_1 \leq U_i$ which is the output weights range of upper-lower limit. v_j is the input weights which fixed at 1, that is, does not considered input variable.

(3) Finally, set and illustrate the corresponding rules, as tabled in Table 7.

Table 1.The Five Experts of Likert Questionnaires (score:1 to 5)

Experts / Score / Parameters	A	B	C	D	E
1 price					
2 quality					
3 multifunction					
4 user-friendliness					
5 diversity					
6 repairing time					
7 timely stock and scales					
8 prices of application software					
9 convenience of software update					
10 Online shopping					
11 after sales service					

Table 2.The First Group Experts of Parameter Scores and Its Weights Sort

Experts / Score / Parameters	A	B	C	D	E	Parameter rank	Parameter weight
1 Price	5	2	4	4	3		0.0752
2 Quality	5	4	4	3	5	1	0.141
3 Multifunction	4	3	5	2	4	2	0.1128
4 User-friendliness	5	3	5	2	3		0.0846
5 Diversity	4	3	5	3	3	4	0.1057
6 Repairing time	3	3	4	3	4	3	0.1122
7 Timely stock and scales	5	2	3	2	3		0.0748
8 Prices of application software	4	2	4	4	3		0.0752
9 Convenience of software update	4	3	4	3	2		0.0705
10 Online shopping	3	2	3	2	2		0.0634
11 After sales service	5	3	4	4	3	5	0.0846

Table 3.The Second Group Experts of Parameter Scores and Its Weights Sort

Experts / Parameters / Score	A	B	C	D	E	Parameter rank	Parameter weight
1 Price	4	3	5	2	4	3	0.1121
2 Quality	5	5	4	4	5	1	0.2103
3 Multifunction	3	5	3	3	2		0.0841
4 User-friendliness	4	5	4	4	4	4	0.1009
5 Diversity	3	5	3	4	3	5	0.0946
6 Repairing time	4	4	4	3	3	2	0.1256
7 Timely stock and scales	3	5	3	2	3		0.0669
8 Prices of application software	3	3	2	2	2		0.0449
9 Convenience of software update	4	4	2	2	2		0.0421
10 Online shopping	3	3	3	2	1		0.0237
11 After sales service	4	4	4	3	3	5	0.0946

Table 4. The Third Group Experts of Parameter Scores and Its Weights Sort

Experts / Parameters / Score	A	B	C	D	E	Parameter rank	Parameter weight
1 Price	5	5	4	4	5	2	0.2072
2 Quality	4	5	4	3	4	1	0.2902
3 Multifunction	3	2	2	2	1	5	0.0778
4 User-friendliness	3	4	1	5	3		0.0463
5 Diversity	2	2	1	3	4		0.0431
6 Repairing time	1	2	2	3	2	4	0.0862
7 Timely stock and scales	2	2	1	1	4		0.0305
8 Prices of application software	3	4	3	2	5		0.0421
9 Convenience of software update	2	2	4	1	3		0.0242
10 Online shopping	1	1	2	5	1		0.0221
11 After sales service	2	1	3	4	2	3	0.1304

Illustration with Example

Smart phones are the main subject of this article. The main affected factors of the market were surveyed, and then this decision-making selection parameter model was utilized to obtain the relevant parameter ranking and its corresponding solution rules.

The steps of building this model are as follows.

Step 1: After market survey, we screened out the main affected parameters, such as prices, quality, multi-function, user-friendliness, diversity, repairing time, the prices of application software, convenience of software update, online shopping and after sales service and, so on. Then set up experts questionnaires of the five scales Likert (1-5), as shown in Table 1.

Step 2: Screen out the parameter ranking: the parameter ranking was obtained by applying the DEA common weight model whose main feature can integrate and correct the former group expert questionnaires scores weights continuously. The results of three groups of expert scores, as shown in Table 2, 3, 4. We utilized the common weight model to screen out the final re-sort results show that the front five main parameters(factors) are quality, prices, after sales service, repairing time and multi-function, as shown in Table 4. We only used three groups of expert questionnaire by turns here. If time and economy permit, one can increase the number of expert questionnaire to obtain more accurate results.

Step 3: Set the contradictions matrix: According to the five main priority factors (quality, prices, after sales service, repairing time and multi-function), the TRIZ contradictions matrix was set, as shown in Table 5.

Step 4: Setting up solution rules (Inventive principle): According to the step 2 likewise, using the common weight model was used to figure out the Inventive principle rules priority as shown in Table 6. At this time, business or organization could review their own core competency and the ability of resource allocation, and the further select the highest priority solving rules. According to Kaplan, Stan (1996), the application of Inventive Principle rule notes are as shown in Table 7.

Conclusion

The innovative contribution of this paper is to demonstrate how one can create the Decision-making parameter selection model (DMPSM) by effectively combing TRIZ and DEA. The strength of this model helps decision makers to figure out how to prioritize the parameters using innovative thinking and quantitative programming techniques. The advantage of using the DEA common weights model is that the score of the last group of expert weights score can be incorporated with the score to obtain the most accurate solution. By using the Decision-making parameter selection model (DMPSM) one can effectively prioritize the parameters based on their score weights. The ranking of the parameters helps decision makers select the most effective solutions.

The Decision-making parameter selection model (DMPSM) is also known as the output-oriented decision-making model as it aims at the study of how corporate performance is affected by outside parameters. In the future, we hope to further investigate the input-oriented decision making potential factors, such as operating background, environment and intra - structured constraints to build up the input-oriented decision-making parameters selection model. By combing both input and output oriented parameters, one can create a Decision-making parameter selection model (DMPSM) that is both complete and accurate.

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Table 5. Contradiction Matrix

Worsening feature / Improving rules / Improving feature	Price	Quality	Multi-function	Repair time	After sales service
Price	+	26,5	6	3,14	28
Quality	8,35	+	23	24	20,24
Multifunction	15	5,9	+	20	16
Repairing time	14	23,20	9, 40	+	22,26
After sales service	8	26,35	15,26	28	+

Table 6. Solution rules ranking of the five main affect parameters

Parameter / Rules / Ranking	Price	Quality	After sales service	Repair time	Multifunction
1	14	5	20	14	6
2	8	23	22	20	40
3	15	20	16	3	23
4	35	9	28	24	26
5			26	28	15

Table 7. the Application Notes of Inventive Principle Rules

Rules / Parameters	The application notes of Inventive Principle rules
1.Price	14. Curvature: the appropriate price is the shortest path leading to the customer.
	8. Counterweight: Information collected by product/market/service sectors, After the balance analysis and re-pricing.
	15. Dynamicity: Information from the customer response team is incorporated into the product design and the development units, and is immediately comply with the market niche and to improve the design.
	35. Transformation of Physical or Chemical States of Object: Special offers of promotional activities are arranged at proper time, changing the ownership of the customer and raising their passion for the product.
2.Quality	5. Integrating: application of Joiner Triangle functioning (quality/scientific methods/ team one), integrated into a creative and developing team.
	23.Feedback:The design process is open to the mode of communication and to invite customers to participate in.
	20. Continuity of Useful Action: Quality improvement is a constant, continuous process.
	9. Prior Counteraction: Product Development Engineers require experiences in sales and customer service.
3.After sales service	20. Continuity of Useful Action: Quality improvement is a constant, continuous process.
	22. Convert detriment/disadvantages into Benefits: Having a problem with the product/service/insurance strengthens the positive perception of the customers more than the level when no problems occur.
	16. Partial, Overdone or Excessive action: the use of more frequent and more information links.
	28. Mechanics Substitution: the set up of a hot desk, customers can input personal information through the touch screen, denoting no paper work necessary.
	26. Coping: More use of virtual manuals and problem solving of products and services on the Internet.
4.Repair time	14. Curvature: the appropriate price is the shortest path leading to the customer.
	20. Continuity of Useful Action: Quality improvement is a constant, continuous process.
	3. Local quality: Customized services, distribution centers close to customers.
	24. Mediator: the establishment of the classification center of the UPS-concepted distribution system, or concept of operations of KLM Airlines Extension system.
	18. Replacement of a Mechanical System: the set up of a hot desk, customers can input personal information through the touch screen, denoting no paper work necessary.
5. multi-function	6. Versatility: Products with multi-functions make abatement of other products.
	40.Composite Structures: With a small and beautiful co-generic system to facilitate the operation.
	23. Feedback: the design process is open to the mode of communication and to invite customers to participate in.
	26. Coping: More use of virtual manuals and problem solving of products and services on the Internet.
	9. Prior Counteraction: Product Development Engineers require experiences in sales and customer service.
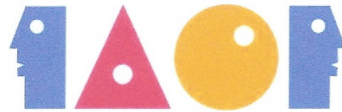
THE IMPACTS OF MODIFIED QC ACTIVITIES ON LOGISTICS OPERATIONAL IMPROVEMENTS: A FINANCIAL FOCUS PERSPECTIVE IN A THAI RETAIL BUSINESS

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Abstract

The challenges of ASEAN Economic Community (AEC) to be started in the end of 2015 with over 600 million people from combined 10 countries have called for self-improvement efforts from many companies in Thailand. This participative research manifested the development and application of the modified quality circle (MQC) activities to non-manufacturing environment so that the basic QC concept and financial emphasis could be blended together, leading to the internal operational changes in a logistics department of the subject company. The findings of this study showed that increasing the problem-solving knowledge and involvement of employees through MQC could help improve the performance of logistics operations. Future research opportunity was identified. This paper also represents another step in defining the field of organization development (OD) with emphasis on the financial implications.

Keywords: Modified quality circle (MQC), Before/After chart, Problem-solving knowledge, Employee involvement, Key performance indicators, Logistics performance

Introduction

"Modified QC (MQC)" is a newly developed concept which was adapted from the typical quality circle methodology introduced by Dr. William Edwards Deming and widely used in the manufacturing companies (Deming, 1986, Strange & Macy, 2001). MQC was designed originally to suit the requirements of a retail group of companies in Thailand. The case company is the long established retail company in Thailand with over 100 famous and luxury brand names products in apparel, cosmetics, watch, and electrical devices. The facilities include over 1,700 distribution channels consisting of shops and counters in department stores, and two apparel manufacturing factories. The increased competition in the market had forced the company to concentrate on cost savings and efficiency improvement in all

areas of business functions. Most of the time in the cost reduction committee meeting, the management of the subject company could not avoid discussion on headcount reduction as the only way to reduce administrative or so called 'back office' costs. Until recently, an MQC approach has been introduced as an alternative measure to cope with the cost burden. The cost improvement project was initiated under the name of CBC standing for C-company name Best Cost. After 4 years of continued practices, the company has seen significant cost improvement results from finished projects. The participative teams consists of groups from several departments such as sales & marketing, internal audit, credit control, human resource, and the factory.

However, due to the relocation of the new distribution center and the major re-organization in the logistics department including high turn-over of the department heads and consolidation of two logistics locations together into the new one, the company has elected a logistics committee to provide policy direction to ensure the continuity of the operations. The pressures from increased requirements for efficient operation affecting the delivery lead time and space availability, the logistics committee agreed to launch MQC to the whole system of the logistics function.

This study is the result of the six months of action research performed at the logistics site of the company. It examines the impacts of MQC which enhanced the problem-solving knowledge and the involvement of employees on the logistics operational performance improvement in terms of operational KPIs and cost saving KPI. The study was done with totally 328 employees including workers and management levels of the entire logistics department. The results have been reported in both quantitative and qualitative analysis below.

What is the Modified QC?

As the traditional QC has been too slow and too focusing in addressing the problem issues and generating the solutions, it is considered ineffective under the current business environment. Moreover, these QC practices could not convey the results clearly enough, especially in terms of the return of investment and impact to the bottom-line of the company. This gap opens up the opportunity for a new QC concept development. The modified QC concept was designed as an intervention tool by applying the basic concept of QC so that it can better serve today's challenges that require high speed of actions under uncertainties. This new concept with emphasis on financial impact takes into account other best practices such as 5S, Lean concept, Kaizen and ControllerFOCUS (Thammatucharee, 2009). After four years of MQC activity launched in the subject company, the latest development of this concept had been applied to the logistics operation as a case study site. Table 1. below presents main differences between the traditional QC and the modified QC.

The Brief History of MQC

At the early stage of MQC development, the concept was based on basic QC concept as shown in Figure 1 below. In the middle of the Figure, issues from daily work are the starting point of the whole process. Once the problem is identified, QC technique is used to understand the cause of problem, which will be followed by finding the right result (represented by the circle at the middle). The next box on the right hand shows the realization of the result. It can be seen that the QC activity can bring the solution through understanding of the cause of problem and implementation of the solution as shown in the boxes at the bottom of the Figure. The

Table 1.   Comparison of Traditional QC and Modified QC

Item	Key Elements	Traditional QC	Modefied QC
1	Authority	Need approval from management before implementing proposals	Has authority to implement suggested idea by the team
2	Team component	Within same department or function	Can be cross-functional
3	Number of members	5 to 15	Not specified
4	Result expectation	Quality, productivity, cost savings	Cost savings, effectiveness and efficiency
5	Outcome presentation	QC story	Before-after chart
6	QC tools	Control chart, cause-effect analysis, Pareto graph	QC tools plus other best practices
7	Other highlights:	Quality cost	Financial impact
		Production	Front-line & Support functions
		Employee driven	Management driven

Figure 1. the Conceptual Framework of MQC Development
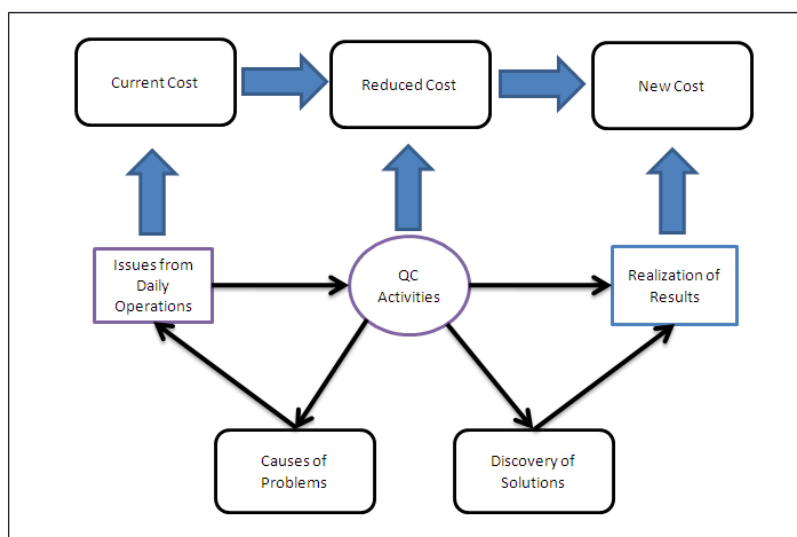
Source: Own analysis

small arrow signs in circles show 2 loops of QC activity to find out the cause and solution. The big arrows depict the relationship of QC activity and the target aimed, which is the cost reduction, resulting from successful implementation of the solution. the company initiated the QC-based activity or so called CBC stands for

"CMG Best Cost" with emphasis on cost reduction at the back-office. This could be considered the initial format of the modified QC. This project was open to everyone to join and contribute to the company. Along the period of over 4 years from 2008 to 2012, the process of the activity has been done on a cycle of one year. The following are main annual activity planned in advance (please see Figure 2 – the Annual Process of MQC Activity

Training – To start the project, training on basic knowledge about QC is essential for everyone so that each can talk with the same understanding. The QC story of 8 steps provides guideline for team members to work together until the team achieves the result. It is intended to organize internal training for 2 times a year.

Group Setting – the group of CBC may consist of 5 to 10 people with members from an individual department or crossed functional departments.

Problem Analysis – Once the QC group has been established, team members need to get together to discuss and brainstorm for the issue and solution.

Solution Finding – the solution can be found using several measures available such as lean concept, electronic transfer, just-in-time, 5S, kanban, pokayoke, and six sigma.

Implementation – the agreed solution from the team has to be implemented until the result can be evident. The measurement of the outcome must be made in financial term with help from supporting team. The calculation of savings consists of hard savings and soft savings.

Contest and recognition – It is important to recognize the performance of each team. This can be done through annual presentation. To make it simple, the presentation is being developed into before and after chart. In this event each team with result will do the presentation in front of the committee. Currently, the MQC activity has been still active with full support from the management. The latest development version of MQC concept can be found in the following sections.

Literature Review

Q.C. standing for quality circle is a small group activity which allows employees to voluntarily work together to fix internal problems. QC has been applied vastly in manufacturing companies for productivity and quality improvement. However, there is still room for improvement in white-collar area (Munchus, 1983). This concept was introduced into Thailand for over 40 years and widely applied in manufacturing companies in order to solve the quality problems. In principle this concept consists of 8 steps: 1) problem identification, 2) selecting the topic – using Pareto diagram, 3) action plan development – by Gant chart, 4) finding the root cause – using fish bone diagram, 5) finding solution, 6) implementation, 7) setting up standard, 8) presentation and proposal.

Quality Circle

The concept of Quality Circle (QC) management has been around for decades with its simplicity of involving employees on voluntary basis in solving problems at their workplace. These problems may include both manufacturing issues (e.g.

Figure 2. the Annual Process of MQC Activity

Source: Own analysis

quality, productivity, efficiency and cost effectiveness); and non-manufacturing issues (e.g. internal administrative processes, logistics and other services). The QC problem-solving technique has been quite successful with Japanese firms as compared to U.S. companies. The impact of QC activity is evident in quality and productivity improvement. Typically QC teams can make recommendation only, the approval for implementation still rest on the decision of the management (Steel et al., 1985).

A quality circle (QC) consists of a group of employees (eight to ten members or five to twelve) from the same work function who voluntarily meet together on a regular basis to identify, analyze, and solve their work problems with the benefit of promoting the morale of employees. (Steel et al., 1985, Tang et al., 1987, Liker & Hoseus, 2008).

According to Banker et al. (1996), quality circles as a format of work team

can improve quality and labor productivity after introducing to employees over a period of time. Even though QC has been widely applied in manufacturing compa-

nies, other business type such as banking and service companies can also apply this tool for internal improvement and even at different environment such as in medical field (Holl & Grabert, 2002; Florida & Kenney, 1991; Barrick & Alexander, 1992).

Quality Circles and Team Development

Quality circle was developed and widely adopted by industries in Japan by the mid-1960s after the introduction of quality control method by American expert – William Deming (Strange & Macy, 2001). In U.S. QCs became the organizational intervention of the 80s (Steel et al., 1985). According to this concept, typically small groups of volunteers form a team in order to solve their problems at the workplace. The main problems are quality, productivity and cost reduction. Regular meetings will be organized to brainstorm and discuss on the issue before arriving at a solution. The QC team gets helps from specially trained facilitators on training about techniques to be used with group process at meetings. (Munchus, 1983; Banker et al., 1996).

Apparently, the success of QC activity highly depends on the success of team

building which is concerned with key variables such as people, leadership, task and organization (Bubshait & Faroog, 1991). In order to create an effective work team, Maxon (1993), Turner (1993), and Woordcock (1997) (as cited in Bubshait & Faroog, 1999, p. 34) suggested that there are five stages in the team development cycle that can result in effective building as follows. Stage 1, forming, is the gathering of team members who have the common interest on a specific issue. Stage 2, storming, is the situation when members have interpersonal conflicts and dissatisfaction. Stage 3, norming, is the stage when members of the team can find an agreement on roles and relationship that result in a cohesive group. Stage 4, performing, is about finding solutions through effective communication, collaboration and creativity that leads to work accomplishment. Stage 5, mourning or reforming, is the final stage when group may dissolve or some members be replaced. This also leads to the first stage of the cycle (Tuckman, 1965, as cited in Amos, Hu and Herrick, 2005).

In order to achieve the QC group outcomes, the effective communication is one of the key success factors. Team building process should be assisted by good strategies. This can be done by strengthening the communication and relationship among team members and facilitators (Amos et al., 2005; Ellis et al. 2008). Moreover, the interface and interaction between frontline marketing people and back-office accounting people can be enhanced through the joint working group under QC. This can be an alternative approach for both marketing and accounting so that closer relationship can be promoted resulting in organizational effectiveness (Roslender & Wilson, 2008).

QC team-building requires understanding of the variables at both group level and organization level. The group performance may depend on several factors such as group composition, group structure, available resources and organizational structure. The effectiveness of each group can be measured by group performance and satisfaction. To be successful in enhancing group effectiveness, it is necessary to perform the diagnosis of the variables and understanding the impact on the group processes consisting of open communication, supportiveness, conflict, discussion of strategy, weighting individual inputs and boundary management. Under this conceptualization, there is direct relationship between group process and group effectiveness, which is mediated by group task variables (task complexity, environmental uncertainty, and interdependence).

Deming's 14 Points for Management

Dr. William Edwards Deming (1900-1993) was a world-renowned consultant in statistics and quality. He was one of the earliest well-known proponents of quality. Several management concepts today can be traced back to Deming's philosophy, teachings and beliefs about quality: for example, total quality management (TQM), reengineering, just-in-time manufacturing. Deming used Shewhart's analysis using graph to understand causes of problems. Deming offered 14 points as a management tool for transforming businesses which can be small or large organizations in manufacturing or services as follows (Cummings & Worley, 2009 & Deming, 1986), as follow.
Create constancy of purpose toward improvement of product and service with a plan to become competitive and stay in business.

Adopt the new philosophy of quality.

Cease dependence on inspection to achieve quality. Require instead statistical evidence that quality is built in.

End the practice of awarding business on the basis of price tag. Consider quality as well as price. Move toward a single supplier for an item, based on a long-term relationship of trust.

Improve constantly and forever the system of planning, production, and service, to improve quality and productivity and constantly decrease costs.

Institute modern methods of training on the job.

Institute modern methods of supervision that emphasize quality rather than sheer number.

Drive out fear.

Break down barriers between departments.

Eliminate slogans, exhortations, and targets for the work force.

Eliminate numerical quotas for the work force and numerical goals for management.

Remove barriers that rob workers (and management) of their right to pride of workmanship.

Institute a vigorous program of education and retraining.

Put everyone in the company to work to accomplish the transformation.

In addition to Deming, other scholars or gurus on quality include Juran, Crosby, Feigenbaum, Taguchi, Ishigawa and Groocock, whose work is related to quality concept has proposed different approaches as shown in the Table 2. Comparative Quality Approaches below (Ghobadian & Speller, 1994).

Table 2. Comparative Quality Approaches

Guru	Definition	Emphasis	Dominant Factor
Deming	Customer-led	Process	Control of variant
Juran	Customer-led	People	Fitness for purpose/use
Crosby	Supply-led	Performance	Conformance requirement/zero defects
Feigenbaum	Customer-led	Process	Total quality control
Crookcock	Value-led	Process	Chain of conformance
Ishikawa	Value-led	People	Company-wide quality control/quality circles
Taguchi	Supply-led value to society	Process/design	Quality loss function

QC Success and Failure

It is important for employees who participate in QC activity to obtain sufficient training regarding the process and techniques that can be used to identify the work-related problem before finding the solutions (Steel et al., 1985). Techniques used in QC include brainstorming, cause-and-effect or fish-bone diagram, Pareto analysis, histograms, and checklists. The QC team members should get training on presentation skill in order to present the project proposal and results to the QC committee as part of the whole activity (Barrick & Alexander, 1992).

A number of studies reported both success and failure of QC implementation due to several factors including manage-

ment and supervisory support, training of problem-solving techniques and reward system (Pereira & Osburn, 2007; Liverpool, 1990). Tang & Butler (1997) argued that there were clearly identified seven factors for QC's problem-solving failure i.e. lack of management support, lack of QC members' commitment, lack of problem-solving skills, QC members' turnover, the nature of the task, lack of support from staff members, and lack of data and time. Tang et al., (1987) observed that the survival of QCs depends on the high level of motivation to participate in meetings. The self-initiated QCs have more advantages than management-initiated QCs as follows.

Self-initiated QCs have more members than management-initiated QCs.

Self-initiated QCs may increase the attractiveness of activities which may attract more members.

However, management-initiated QCs can result in higher performance than self-initiated QCs in terms of quantity and speed. The management and supervisor support is one of the most important success factors in implementing QC (Harman et al., 2002). Thus it is practical to have one of the management or supervisor as part of the QC group.

According to the QC process, one of the QC strengths is the finding of root causes of problem. However, not much has been discussed on how to find the best solution. This leads to the room for improvement on QC activity. Once the cause of problem is identified, the approach toward the solution finding should be considered. According to Kamis and Kahn (2008), Huber's stages of problem solving includes:
Understand problem
Plan solution
Evaluation and choice of Alternative Solutions
Implementation of chosen solution

Monitor and review the solution

To find the best solution, the five-stage model of D'Zurilla and Goldfried (1971) suggested that the more alternatives generated, the better likelihood of finding the best solutions (Ronan et al. 1995).

QC Benefits Measurement

Implementing QC can result in both direct benefits such as quality, productivity and cost savings, and indirect benefits such as employee motivation improvement and favorable attitude enhancement. Barrick & Alexander (1992) argue that most QC benefits have been measured based on the improvement projects with less attention to productivity gain realization. The financial benefits should be calculated based on the standard and assumption used so that the work performance can be more completely accounted for. There are 2 types of cost savings – hard cost savings and soft cost savings.

Hard savings means the amount of money saved in terms of cash reduction, for example, the price reduction as a result of negotiation, the elimination of loss of incurred expenses and so on.

Soft savings means the savings that may not be realized in terms of actual money saved but have impact on the non-financial savings or improvements instead, for example, the increased productivity and efficiency.

However, companies should emphasize on hard cost savings which have direct impacts on the bottom-line more than soft cost savings which reflect efficiency improvements (Ellram, 2008).

Self-developed Small Group Activity

In order to survive in the turbulent economic era, several companies have tried to introduce customized improvement

programs under different names. Each tailor-made program comes with its own campaign and concept applying existing practices and mixed with what the company wants to focus such as productivity, quality, housekeeping, and cost savings. Examples of these companies are Toyota, Kao, and Panasonic.

Panasonic has launched the global cost savings project under the name 'Cost Buster' which encourages all types of savings from either an individual employee or a team. The company has organized a monthly contest worldwide to recognize the best performer in creating the improvement theme and the highest number of ideas. The major distinct technique is the presentation of the result that will be put in the prescribed format of one page called 'Before/After Chart (or BA Chart)'. Under this chart, the topic of saving will be put on the top of the page together with the picture and name of the idea owner. Below this headline is the split of condition of the subject between before and after with explanation in terms of narrative or pictures depending on how the owner will creatively present the topic (please see Figure 3 – Before/After Chart below).

Figure 3. Before/After Chart
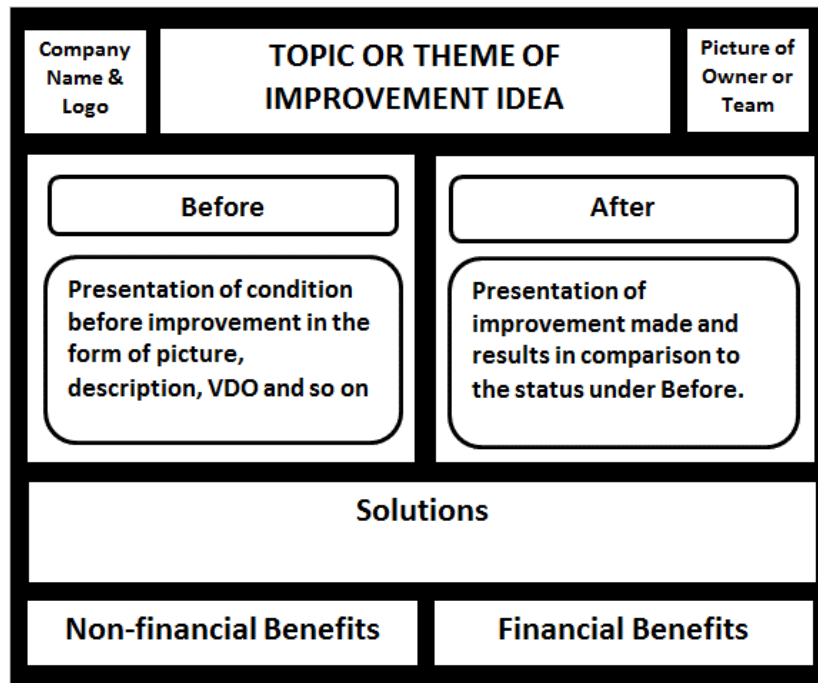
The Cost Focus and Cost Management

There is still a need to better understand the cost management in operations. As Johnson and Kaplan (1987: 244) noted:

We [researchers] have been as guilty as conventional product cost systems in focusing narrowly on costs incurred only in the factory. Manufacturing costs may be important, but they are only a portion of the total costs of producing a product and delivering it to a customer. Many costs are incurred "below the line" (the gross margin line), particularly marketing, distribution, and service expenses (Anderson, 2005: page 22).

Strategically, cost leadership is one of Porter's (1980) competitive advantages that link to financial and managerial accounting functions (Ruhl & Kreuze, 1997). In a retail and marketing company like CMG, marketing seems to look at the problems from revenue perspective whereas operations seem to look from cost perspective (Rust, Moorman & Dickson, 2002). No matter what kind of businesses, for-profit or not-for-profit, uncontrollable cost can result in performance failure or operating loss instead of expected profit and return on investment (R.O.I.). In order to be competitive and survive in the marketplace, cost reduction can be considered one of the selected strategies and key success factors on which businesses should put high emphasis (Blocher, 2009).

Management accounting, developed into strategic management accounting (SMA), has played important role in supporting the cost improvement efforts leading to several initiatives on cost management and control, for example, the introduction of activity-based costing (ABC), attribute costing, competitor cost assessment, life cycle costing, quality costing, strategic costing, target costing, value chain costing, and related concepts concerning with strategic cost improvement such as balanced scorecard, zero based budgeting, and so on (please see appendix B for glossary of terms and abbreviations). However, the success in strategy accomplishment by management accounting is still questionable (Otley, 2001; Langfield-Smith, 1997, 2008; Ittner & Larcker, 2001; Hoque & James, 2000; Baird et al. 2004; Hoffjan, 2004; Dekker & Smidt, 2003; Tatsiopoulos & Panayiotou, 2000; Blocher, 2009, Fleischman & Tyson, 1998).

Strategic Management Accounting and Controllership

The global crisis has raised questions and challenged the accounting and controllership realm from several view-points.

We have seen large financial institutions collapsed, bought out, and governments have had to launch rescue packages to bail out their financial systems. Accounting and auditing professionals and scholars seem to have certain share of responsibility in failing to signal and prevent the impact of the crisis. Corporate accountants and stakeholders have been waiting for an accounting innovation that can really help businesses grow on a healthy manner instead of just re-launching and modifying the accounting standards within the framework of double-entry accounting concept. Many academics and practitioners have subsequently discussed and criticized the ways in which companies prepared their information and how it has been utilized to maximize the sustainable wealth of the businesses through effective strategic achievement.

There has been a trend for management accountants have migrated toward a business partner role (Victoravich, 2010). However, it is observed that management accounting practices go back to mid-1980s with little new developments (Otley, 2001). The terms management accounting (MA), management accounting system (MAS), management control system (MCS), and organizational control (OC) are sometimes used interchangeably. There is evidence suggests links between strategy, cost control and performance evaluation (Chenhall, 2003).

Management accounting is an applied science that needs to be developed further from the existing well-known practices such as ABC, BSC to address what system to use , how and in which circumstances (Malmi & Granlund, 2009). Balanced Scorecard (BSC) looks at four key perspectives i.e. financial perspective, customer perspective, internal-business-process perspective, and learning and growth perspective. However, Hoque & James (2000) observed that larger organizations are likely to make more use of a

BSC. In driving strategies, scorecards cannot be successful without full support and understanding from back office team like accounting and finance. Generally controllers have advantages in organizations to exploit both financial and operational information in helping companies to attain goals. This opens an opportunity for controllers who can develop new skills covering other functional knowledge so that they can perform the work strategically.

Baird et al. (2004) observed that the adoption rate of activity management practices is increasing supporting the relevance of Activity-based costing (ABC). We need to expand the knowledge of the management control system (MCS) and business strategy (Langfield-Smith, 1997). However it's time for businesses to shift from costing-based to resource-based management which allow employees to uncover unrecorded or unidentified financials such as hidden losses, operational wastes, and negative impact of employee morale.

Organization theories and social philosophies have contributed much to the management accounting (Hopper, 1985). Ezzamel et al. (1990) observed that managing by numbers may not be sufficient in the overall control system. The company will no longer be measured on financial successes but also how the wealth created has been shared to society. Griffin & Mahon (1997) called for more research on the relationship between corporate social performance and corporate financial performance that could reflect the contingency of financial measures. In the decentralized firms, the management accounting practices designed to improve the local decision making can exacerbate control problems. However, the practices that emphasize corporate control can undermine local decision making of the local firms (Indjejikan & Matejka, 2006).

The roles of accounting and controllership have been questioned since the

Asian Crisis in 1997 and also the current global credit meltdown. Thus it's time to seriously review and standardize the accepted practices over accounting and financial supervision. Burn & Baldvinsdottir (2005) argued that globalization and internationalization are key drivers of role(s) change for management accountants, which can result in new business-oriented roles for so-called 'hybrid' accountants.

Strengthening the controllership of a company requires understanding, cooperation and support from all employees who embrace the concept and procedure of good corporate governance. In Asia, where the working culture does include seniority belief, subordinates seem to listen to the senior people and don't want to challenge the inappropriate practices unless they really have to. How can we address this issue so that a new culture change can be started? the new controllership paradigm is being shaped by incorporation of the entrepreneurship spirit and innovation into the practices of controllers. Davila et al. (2009) concluded that:

The field of accounting and control has changed significantly over the last decade. New concepts and new empirical evidence have challenged the traditional control paradigm. The paradigm that is emerging interprets control as a key element of dynamic organizations rather than a peripheral, even negative element (Davila et al., 2009, p.300).

In an attempt to prevent the economic meltdown in the future, a more powerful warning system should be created and instituted into businesses and ultimately developed to the global level. The sharing and integration of knowledge concerning with effective controllership together with necessary regulation, should be seriously considered. The proposed ControllerFOCUS strategy web can used to ensure the balance of key factors under the ControllerFOCUS concept (Thammatucharee,

2009). Please see Figure 4 - Controller-   FOCUS Strategy Web below.

Figure 4. ControllerFOCUS Strategy Web
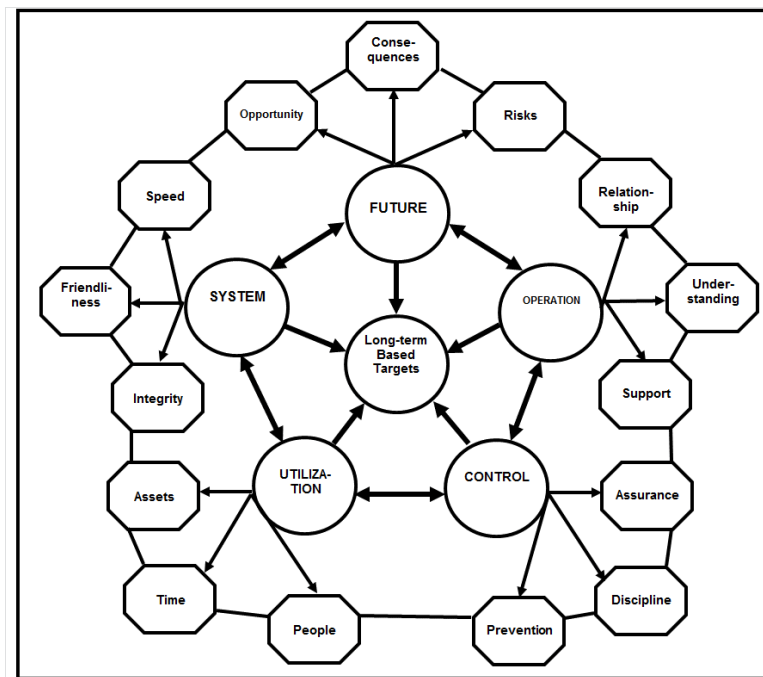
Logistics and Warehouse Management in Retail Business

Definition of logistics from Merriam-Webster's Dictionary and Thesaurus, 2006 is "the procurement, maintenance, and transportation of material, facilities, and personnel." Logistics becomes the backbone of the international trade, especially the upcoming AEC. Logistics has evolved from 19th century in firstly military operations to today's business supply chain. The functions under logistics activities involve freight, transportation, warehousing, customs clearance, payment systems and other related functions.

Logistics as part of trade facilitation process can help grow business faster and improve competitiveness. The movements of materials and products from one source to another needs to be managed in the most effective and efficient manner. In order to ensure the continuity of products for sales, some inventory must be kept for replenishment purpose. However, too high inventory also cause unwanted handling and keeping costs.

Retail logistics is concerned with getting the right products to the right place at the right time. Logistics management in retail consists of 5 key components as follows.

Storage facilities – Warehouses or distribution centers are managed to keep stock that can be delivered to meet market needs.

Inventory – Finished goods are made available to serve customers. But it should be kept at minimum level to avoid additional cost.

Transportation – Transferring products from one place to another to response to the requirement of sales people.

Unitization and packaging – Keeping products in the package and in good condition for sales.

Communication – Important information has to be complete and accurate to ensure the effective and efficient operations through communication.

These functions need to be integrated to ascertain effective inventory management towards stockless system. Holding stock in warehouse is costly with associated cost and investment such as building the warehouse, maintenance cost, handling cost, financial cost and so on (Fernie & Sparks, 2009).

Research Methods

Hypothesis Development

The subject company is encountering the challenge from the rapid business expansion and increased competition in the market. It was evidently expressed in several management meetings of the company regarding concerns over the low performance of the logistics department. The logistics team of around 300 employees is facing with increasing demand for products delivery and services to fulfill the brand requirements. The limitation of warehouse space and potential demand for business growth has pressured the logistics team to improve itself effectively and continuously.

In order to find solution to existing and potential problems, the management through the logistics committee agreed with the researcher's proposal to implement the MQC at the logistics department as a measure to cope with this challenge. The researcher had participated in the logistics improvement process as a coach

and internal consultant to the logistics management. Along the research period of six months, the training on modified quality circle was conducted to all employees with facilitation from the team from the head office so that the new improvement projects can be initiated and materialized for the benefits of the logistics department and the company as a whole. Figure 5 demonstrates the conceptual framework for this research with 2 independent variables (problem-solving knowledge and employee involvement) and the dependent variable – logistics KPI improvement (both financial and non-financial aspects).

Research Objectives

The following are main research objectives for this study.
…To find out the impact of modified QC activity on the operational performance of logistics department.
…To design and develop ODI that enhances problem-solving knowledge and involvement of employees in the logistics operations using MQC concept.
…To analyze the results of the ODI on both financial and non-financial improvement of the logistics operations.
…To generalize and refine the concept of modified QC for further development in the change process.

Research Question

Does the organizational performance increase after implementing the modified quality circle (MQC) which enhances the problem-solving knowledge and involvement of employees?

Figure 5. the Conceptual Framework
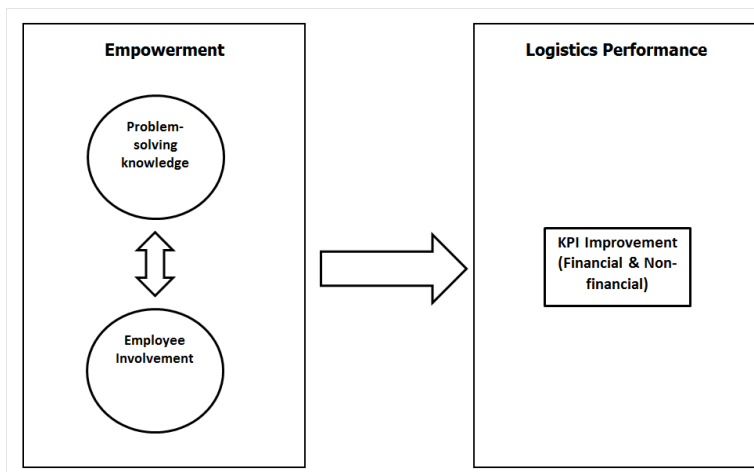
Research Hypotheses

To assist the development of this study, the following research hypotheses were taken.

H1: the organizational performance is increased after implementing modified quality circle (MQC) at the logistics department.

H2: the logistics key performance indicators (KPIs) are improved after the adoption of modified quality circle (MQC).

H3: the logistics cost position is improved after the adoption of modified quality circle (MQC).

Research Process

The researcher has got approval for performing the action research from the management of the company through the submission of the project to executive vice president of human resource department. Moreover the researcher had informed the CEO and got approval for doing research at the case company. As part of the assignment from the management, the researcher has advocated working time on a regular basis to visit the case department to join in weekly meeting, monthly meeting, review with logistics analyst team, and face-to-face communication with the VP of logistics.

Figure 6. Research Methodology below demonstrates three stages of organization development intervention (ODI) ranging from the pre-ODI, ODI and post-ODI activities which can be described as follows.

The assessment step of the company or pre-ODI included analysis at both company level and the logistics functional level using SOAR and SWOT analysis. This helped reveal areas where improvement should be made. The process of assessment also included interview, re views of past records and so on.

The intervention step consists of several techniques used as shown in the Figure above. This is a continuous improvement cycle where each tool was selected at the suitable timing. Particular situations had

Figure 6. Designed Activities
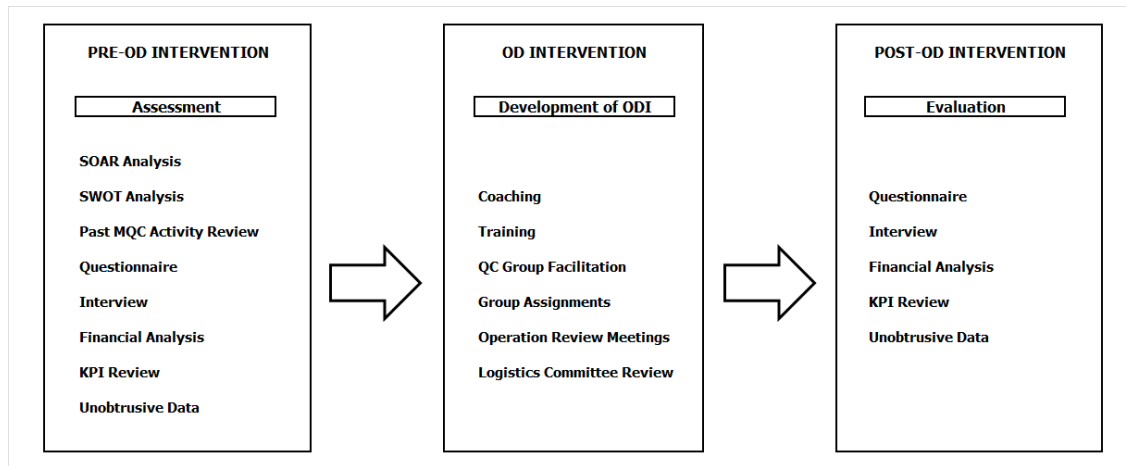
Table 3. the Reliability Test of the Questionnaire

Reliability Statistics

Questions Type	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No. of Items
Problem-solving Knowledge	.836	.838	5
Employee Involvement	.732	.734	5
Logistics Performance	.727	.767	6
Total			16

led to the employment of certain methodology deemed appropriate for the team.

The final review had been made after six months of study. The results had been analyzed so that the conclusion could be drawn in response to the objectives of the study and the hypotheses made.

The researcher developed questionnaires to understand perception of the variables before and after the interventions were done. This was developed by adapting from relevant studies and had been tested with 2 different groups of people before final revision which resulted in the reliability test result as shown in Table 3. below.

The researcher had joined several meetings at the logistics department for observations and coaching with the management. Interviews had been performed with employees and management of logistics and also with internal customers such as the brand managers and senior executives. At the end of six month study, each successful MQC team had a chance to present their results to the committee. The questionnaire had been distributed to the participants again with the results to be discussed in the next section.

Results and Discussion

This paper has discussed the elements underpinning the MQC concept of employee involvement in the operational performance improvement in the logistics department of the subject company. An action research had been used together with quantitative research from the designed questionnaire.

The Process of Modified QC

The modified QC has been developed from the past 4 years with emphasis on the operational performance and the cost savings. As a result of the study, the concept was enhanced with the basis of PDCA (Plan-Do-Check-Action) and the financial emphasis under Controller FOCUS concept. The latest development of the concept can be illustrated in the Figure 7. MQC process below with eight steps of MQC considerations.

Figure 7. MQC Process
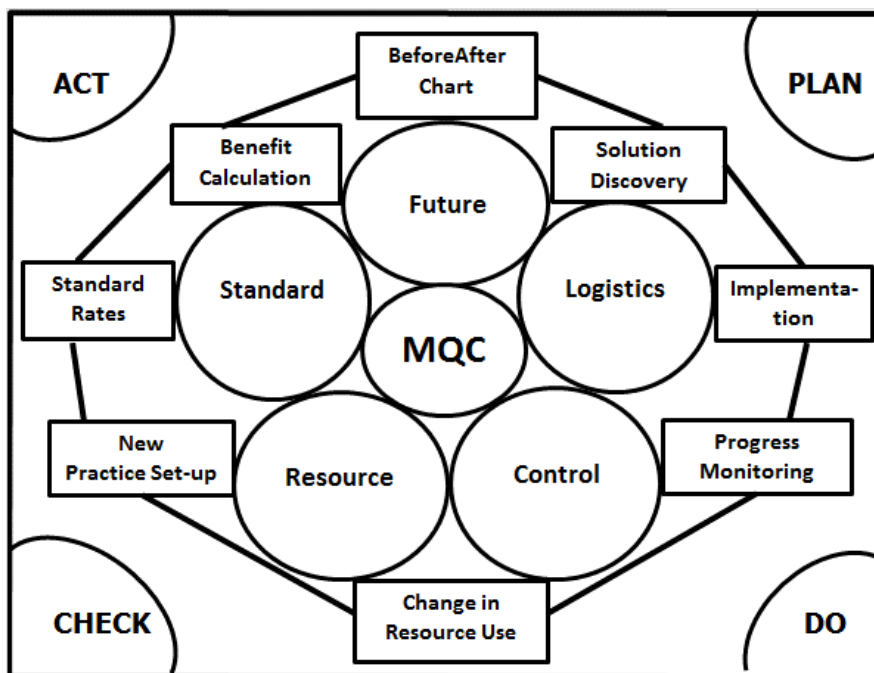
Step 1 – Solution Discovery: the MQC team performed the improvement process under QC concept using tools such as fishbone diagram, data collection and analysis. This would lead to the selection of topic for improvement. After the brain-storming and other creativity approach by the team members, final solution was generated and ready for implementation.

Step 2 – Implementation: Once the decision making was done, the team would get approval from the functional managers for changes to be made. The implementation

process started from the design or plans made out of the team. The time table was set up with concerned people assigned to take part in the change process.

Step 3 – Progress Monitoring: It was important for the team to closely look at the progress made along the whole process to ensure that the achievement could be made as expected. However, if there were any cases that caused the team to review the plan again, it would be done under the PDCA concept again. This could lead to a new solution.

Step 4 – Change in Resource Use: the successful implementation could result in improvement in several areas affecting the utilization of the company's limited resources. For example:

The efficiency might improve from time saving or less manpower used,

The cost saving was made from the internal process change,

The sales might improve from the better response to the market from faster delivery,

The space of warehouse might increase from the initiative made in better way of keeping and arrangement.

Step 5 – New Practice Set-up: the new way of doing things could become a new standard practices. This better process should be properly documented and communicated to concerned parties within the organization for the same understanding and better coordination. Certain types of procedure might need to go through the approval and announcement process under the company's regulation.

Step 6 – Standard Rates: In order to understand the impact of the improvement made in terms of financial savings, it was necessary for the company to use the information obtained from the accounting and financial department. This might consist of either financial or non-financial information, for example, the standard cost being used, the actual expense incurred, the budget numbers, the estimates of space usage and so on.

Step 7 – Benefit Calculation: In business, one of the effective ways to communicate cost or benefit was to express it in financial term. It was easier to tell others how much savings had been made as compared to the qualitative expression. Even the opportunity gain or loss could also be reflected in financial term. However, this needed to be based on explainable and reliable information. The financial impact is calculated by taking into account the results from step 4 and 5, which can be derived from the basic formula below:

Financial Impact (FI) = Standard Rate (SR) * Improvement Made (IM) (1)

Where:

FI: The calculated financial impact based on the basic formula and taking into account conditions and criteria set in the calculation guideline.

SR: The standard rate expressed in financial term, which represents the current condition of various factors e.g. labor rate, rental rate, interest rate and so on.

IM: The measured improvement resulting from the successful MQC activity. The result has to be linked to the measurable rate through the rationale and justification made.

Example of Application

Let's assume that an MQC team has achieved the project of saving the cycle time in the picking and packing process which can reduce the operating time by 2 minutes per order. How to calculate the saving? In this case the improvement (IM) is time saving by 2 minutes per order. If the team has to process the orders received from the marketing department for 200 orders per month. Average improvement time will be 400 minutes per month (200 orders times 2 minutes of saving per order). The next step is to find out the standard rate (SR) for the financial value of time reduction. By obtaining the actual information, the cost of time representing the labor and fringe benefits of employees for this particular operation is 1.63 Baht per minute. Therefore, the calculated monthly financial saving (FI) for this improvement will be 653 Baht per month (400 minutes time 1.63 Baht per minute) or 7,841 Baht per year (653 Baht per month times 12 months).

Step 8 – Before/After Chart: To convey the message of the improvement project result, the simple but effective way was to put it into the Before/After chart which could summarize the status of the situation before and after improvement within a one page of presentation.

The Challenge of Financial Reflection on OD Results

How improvements made from OD activity impact the bottom-line of a company has been a challenge question to OD practitioners. The MQC has emphasized on translating the results from the OD improvement in the financial terms in a way that can make business people understand better. Certainly, it is impossible to calculate every kind of improvement into amount of money. However, with a designed calculating method, it might be possible to at least explain the impact of improvement in both direct and indirect ways.

Under MQC, the savings are classified into 2 types: the hard savings and soft savings. Hard savings refer to the measurable savings that can be realized from the real cash basis. For example, saving made from using cheaper materials or supplies, saving from renegotiating of the service contract amount, and so on. This kind of saving can be seen from the accounting book and effect the bottom-line of the company.

On the other hand, the soft saving is the calculated saving that may not be realized today. It could mean the saving that can materialize when certain condition is met. For example, the improvement in an operation cycle time could be measured when the normal time has been used up. The calculated saving may represent the additional work time such as over-time working.

Another aspect of financial impact calculation is the period of which the saving should be realized. Under MQC concept, it was set up that a one year period for continued savings should be calculated.

The following is the table of calculation basis that can be used as reference.

Results

The implementation of MQC to logistics function involves 328 employees throughout the organization. During the period of the 6 month study, the interventions included training, coaching, workshop and special assignment. The result of the study was demonstrated through the presentation of each team with successful project.

Out of totally 32 teams, 81.25% were successful representing 26 teams who could deliver the results on the contest day. Most of the teams which failed to carry out the successful projects were due to the nature of the work in the transportation section. Most of the team members were drivers and could not come back to join the team meeting as schedule. With regard to the quantitative analysis, the questionnaire test analysis showed that on average, members of the team improved on both problem-solving knowledge and involvement in operations, which resulted in better KPI achievement and cost savings as shown in Tables 5., 6. and 7. below.

Table 4. Approach to Cost Saving Calculation

Item No.	Possible Types of Improvement Project	Approach to Saving/Benefit Calculation
1	Cycle Time and Process Time Saving	The time reduced multiplied by the labor cost or elimination of over-time working.
2	Area Space Allocation Saving	The saved space multiplied by the rental rate plus the maintenance cost saving.
3	Expenditure and Cost Saving	The amount of calculated saving resulting from the improvement project.
4	Productivity Increase	The potential cost per unit reduction when the capacity is increased.
5	Manpower and Headcount Saving	The salary and benefit cost per headcount that is saved.
6	Sales Opprtunity Increase	The proportion of sales increase results in additional margin from early launch of products.
7	Inventory Level Decrease	The financial cost and stock keeping cost represent savings.

Table 5. Group Statistics Before and After MQC Process

PERIOD		N	Mean	Std. Deviation	Std. Error Mean
Problem-solving Knowledge	Before	330	3.5230	.55001	.03028
	After	328	3.7128	.45771	.02527
Employee Involvement	Before	330	3.4624	.60463	.03328
	After	328	3.7152	.47185	.02605
KPI Improvement	Before	330	3.6535	.61075	.03362
	After	328	3.8283	.53929	.02978
Cost Savings	Before	330	3.0808	.69119	.03805
	After	328	3.5173	.63082	.03483

Table 6. t-Test of Groups Before and After MQC Process

	t-test for Equality of Means						
			Sig. (2-tailed)	Mean Difference	Std. Error Difference	of the Difference	
	t	df				Lower	Upper
Problem-solving Knowledge	-4.809	656	.000	-.18977	.03946	-.26726	-.11229
Employee Involvement	-5.977	656	.000	-.25282	.04230	-.33588	-.16976
KPI Improvement	-3.890	647	.000	-.17472	.04491	-.26291	-.08653
Cost Savings	-8.461	651	.000	-.43647	.05158	-.53776	-.33518

Table 7. The Correlation Test Results

Correlations		Independent Variables		Dependent Variables	
		Problem-solving Knowledge	Employee Involvement	KPI Improvement	Cost Savings
Problem-solving Knowledge	Pearson Correlation	1	.620**	.592**	.362**
	Sig. (2-tailed)		.000	.000	.000
	N	328	328	328	328
Employee Involvement	Pearson Correlation	.620**	1	.576**	.501**
	Sig. (2-tailed)	.000		.000	.000
	N	328	328	328	328
KPI Improvement	Pearson Correlation	.592**	.576**	1	.388**
	Sig. (2-tailed)	.000	.000		.000
	N	328	328	328	328
Cost Savings	Pearson Correlation	.362**	.501**	.388**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	328	328	328	328

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

The mean showed improved level as compared between before and after MQC process. The mean value in 'After' category was higher than the value in 'Before' category representing improvement in all variables above.

The t-test results also showed improvement in every category of questions under problem-solving knowledge, employee involvement, KPI improvement, and cost savings as shown in the above table.

By using Bivariate Correlation analysis, it was found that:

The problem-solving knowledge had positive impact on the KPI improvement with the correlation value of 0.592 according to the above table.

The problem-solving knowledge had low impact on the cost savings as the correlation value was 0.362 as shown in the table.

The employee involvement had positive impact on the KPI improvement with the correlation value of 0.576 as shown in the table.

The employee involvement had positive impact on the cost savings with the correlation value of 0.501 as shown in the table. Even though the problem-solving knowledge and cost saving did not show positive correlation, each successful team can provide the result financially based on the financial impact calculation methodology guideline (please see Table 8. MQC Financial Impacts).

The calculated financial savings accounted for about 4 million baht or about 158,000 US dollars according to the guideline used covering both hard and soft savings over the measured period of one year. The KPIs of the teams including the space

Table 8. MQC Financial Impacts

[Amount in local Baht]

Item No.	Team Name	Saving Per month		Total Monthly	Saving Per Year		Total Annual Saving	In USD
		Soft Saving	Hard Saving		Soft Saving	Hard Saving		
1	T-1	11,375	-	11,375	136,503	-	136,503	4,550
2	T-2	368	-	368	4,410	-	4,410	147
3	T-3	6,865	-	6,865	82,381	-	82,381	2,746
4	T-4	8,364	-	8,364	100,372	-	100,372	3,346
5	T-5	17,063	-	17,063	204,755	-	204,755	6,825
6	T-6	8,531	-	8,531	102,377		102,377	3,413
7	T-7	4,000	-	4,000	48,000	-	48,000	1,600
8	T-8	11,406	-	11,406	136,871	-	136,871	4,562
9	T-9	1,901	-	1,901	22,812	-	22,812	760
10	T-10	15,789	-	15,789	189,462	-	189,462	6,315
11	T-11	4,848	-	4,848	58,170	-	58,170	1,939
12	T-12	8,751	-	8,751	105,017	-	105,017	3,501
13	T-13	-	3,663	3,663	-	43,950	43,950	1,465
14	T-14	10,645	-	10,645	127,746	-	127,746	4,258
15	T-15	33,114	-	33,114	397,372		397,372	13,246
16	T-16	8,531	-	8,531	102,377	-	102,377	3,413
17	T-17	-	16,557	16,557	-	198,686	198,686	6,623
18	T-18	12,643	-	12,643	151,713		151,713	5,057
19	T-19	1,105	-	1,105	13,255	-	13,255	442
20	T-20	16,838	15	16,853	202,054	184	202,237	6,741
21	T-21	7,761	-	7,761	93,134	-	93,134	3,104
22	T-22	33,114	-	33,114	397,372		397,372	13,246
23	T-23	-	6,383	6,383	-	76,600	76,600	2,553
24	T-24	24,417	39,625	64,041	293,000	475,494	768,494	25,616
25	T-25	33,114	-	33,114	397,372	-	397,372	13,246
26	T-26	-	48,833	48,833	-	586,000	586,000	19,533
Total		280,544	115,076	395,620	3,366,524	1,380,914	4,747,438	158,248

Figure 8. Example of Before/After Chart

utilization and productivity had improved
in distinctive areas.

The Presentation of the Success with Before/After Chart

One of the difficult skills for logistics team members was the computer literacy, especially in preparing a series of power point presentation. To cope with this problem, the one page Before/After chart was developed as an alternative for any team who prefer to present based on this one slide. An example of this chart is shown in Figure 8. below.By using the above chart, the presenter could explain the whole project starting from the beginning until the achievement was made. The above example showed the status before improvement was made and the change process on a step-by-step basis. The proposed solution could be explained to listeners as part of the presentation on an easy to understand format. Finally the benefits obtained in both financial and non-financial aspects were summarized clearly as part of the slide.

Logistics Employees and Management Feedback

The feedback of internal clients also showed improvement when asked during the interview by comparing between the performance before MQC and after MQC process. Based on the survey from all 32 teams, over 90% of employees expressed the improved ability in the problem-solving activity and 85% of employees expressed the higher level of involvement in decision-making and operational solution finding.

According to the interviews with key management consisting of both supervisors and managers of 9 people, the results showed the change in the following aspects comparing between the status before and after applying MQC. The assessment was made by asking interviewees to evaluate in 3 different levels i.e. low, medium and high. The summary of the management assessment result is showed below.

Problem-solving Knowledge – It appeared that 56% of the management saw improvement from low level to medium, and 44% from low level to high level.

Employee Involvement – It appeared that 33% of the management saw improvement from low level to medium, and 67% from low level to high level.

KPI Achievement – It appeared that 67% of the management saw improvement from low level to medium, and 33% from low level to high level.

Cost-saving Achievement – It appeared that 89% of the management saw improvement from low level to medium, and 11% from low level to high level.

Internal Customers' Feedback

Based on direct interviews with seven internal customers consisting of sales and marketing executives who need to work closely with the logistics department in making sure that the products will be made available on a timely and accurately manner, it was found that 86% of the interviewees agreed that the overall performance of the logistics team had improved from the last 6 months. However, the score showed slight improvement from 2.4 to 3.0 according to Likert scale. Some of comments from internal customers include:

> *"Logistics team should work together as a team more so that everyone can understand the expectation from the brand. We are also concerned about the skill development that should be strengthened especially for the new joiners" – Brand executive 1.*

> *"We would like to see more improvement on warehouse space management and the delivery time.*

Returned products should be processed quickly so that we can see the most updated information in the system" – Brand executive 2.

"I preferred logistics members to see and treat brand people as customers. Even though the work in general was improved but increased volume would become a challenge to logistics team in the future." – Brand executive 3.

Hypothesis Test Results

H1: the organizational performance is increased after implementing modified quality circle (MQC) at the logistics department.

Based on both quantitative and qualitative analysis, the results showed that both KPI and cost improvement improved after implementing MQC during the past six month. With interview performed with internal customers, the result also indicated that the level of overall improvement seen was improved significantly. Thus hypothesis 1 is confirmed.

H2: the logistics key performance indicators (KPIs) are improved after the adoption of modified quality circle (MQC).

According to the successful projects implemented under MQC, each team reported the improvement on their functional KPI as a direct impact from the MQC activity. Thus hypothesis 2 is confirmed.

H3: the logistics cost position is improved after the adoption of modified quality circle (MQC).

Even though the quantitative result showed low impact of cost improvement after implementing MQC, the successful can present the positive financial impact in the format of Before/After chart. Thus hypothesis 3 is confirmed.

Conclusions

This study was another step of MQC development firstly initiated by the researcher since 2008 in a Thai retail company. The concept development was mainly based on the combination of quality circle concept (Deming, 1986), the financial emphasis under ControllerFOCUS, and Before/After chart (Thammatucharee, 2009). As the concept exists as part of the internal improvement activity, the sustainability and success still depend on many factors such as company's policy, management support, allocated budget and participation of all employees and so on. In the new era of business management where simplicity and effectiveness are crucial, the proposed MQC must represent a new tool that could be applied in any environment.

The researcher found five main contributions in this paper:
1.   To put forward the mechanism in linking the internal improvement activities as a continuous process to the business performance improvement. In this case the MQC can be generalized within the company's different functions.
2.   By focusing on the financial impact derived from the success of each team, it is a mean for business people to better understand the linkage between the improvement activity and the result to the company's bottom-line.
3.   This study demonstrated that the company can create a good practice in the form of small group activity, which opened up an opportunity to cultivate a culture of employee involvement and continuous learning in the organization.
4.   The finding of a new form of QC can be applied in other businesses and under any environment due to its simplicity and high flexibility in the process adaptation. This also means practicality in other countries worldwide.

5. The MQC activity has opened up an opportunity for everyone in an organization from the bottom to the top in order to be involved as part of the team. This fulfills the morale and motivation enhancement for employees as obviously seen from the study.

Limitations and Future Research

The term modified QC indicates the opportunity for further development of traditional QC concept which requires a more effective and practical improvement activity that involves all levels of employees in an organization. Future research might focus on how to cultivate the MQC activity as part of the corporate culture. For example, by taking into account the KPI set-up that incorporate the progress and success of the MQC projects, employees could feel that participation in on-going improvement projects become part of the routine job. It is also interesting to better understand how an individual, a team or an organization can make self-change process happen. How to measure the capability and sensitivity to make change on a timely manner could be another topic of interest.

In this study, there were several limitations. Firstly, the time constraint had caused difficulty for every team to make satisfactory progress according to the planned schedule. Secondly, the role of the researcher as a coach to the teams and the management of the company could cause confusion in decision-making either for the benefits of the company or the study. Finally, the budget allocation for this study was limited and required full support from the management.

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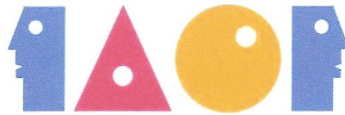
A STUDY ON IMPACTS CREATED BY REAL ESTATE
SECURITIZATION ON CONSTRUCTION INDUSTRY IN TAIWAN

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Abstract

For a long time, financial institutions credit and housing pre-sale have been the two major approaches in raising funds for the construction industry. However, due to the excessive number of unsold houses and the continuously growing NPL (Non-performing Loan) ratio in the real estate business, financial institutions have now reduced loans to the construction industry in a dramatic way, a move that makes the construction industry become less successful in the operations. A major issue the construction industry now has to deal with is, besides seeking financial institutions credits, to raise funds by other means. As Taiwan is seeing its declining economy as a product of the recessing world economy – also influenced by many other factors – company closures have become nothing new in the construction industry. Such development severely hurts the economy of the island. Therefore, making the construction industry physically sound is a key issue.

Based on this research, the U.S. experience tells us that a real estate securitization does help to revive the housing market, improve mobility, and reduce risk, as mobility and risk are both important elements for introducing funds. Eventually, the real estate securitization shall be built upon real estate assets trusteeship and real estate investment trusteeship as operating models. In the model, when it comes to fund raising, real estate securitization is a popular, unitary, and highly mobile credit approach. Building the main body is to erect a transaction bench for the real estate of minimum mobility and substantial fund while activating the value. Operation management also details the means to upgrade the current construction industry from a capital and labor-intensive manufacturing activity to a construction service industry, which is more specialized in knowledge and technology, thus providing a new business opportunity for the upgraded construction industry.

In this research, the literature review, as well as the comparative analysis of the real estate securitization systems in Taiwan and overseas help build the operation model for real estate securitization. Through the successful development of the model and a case analysis, this research aims to demonstrate the cause-and-effect relationship created in the research while examining the difference between the physical cases. The impact created by real estate securitization on construction industry, in the short term, is the introduction of real estate assets trusteeship and investment trusteeship, and in the mid and long term, the change in credit granting and concern about business management.

Keywords: real estate securitization, real estate asset trusteeship, real estate investment trusteeship, asset utilization

Introduction

Motive and Background of the Study

For quite some time, the construction industry operates its building and selling as the developer raise funds on financial institution credits and housing pre-sale. Now, with the excessive number of unsold houses and the dramatic reduction of credits by financial institutions for the continuously growing real estate NPL (Non-performing Loan) ratio, the construction industry and its affiliation are having troubles in running the business (Li, 2003). For the construction industry, the priority is to seek other approaches of fund raising from the capital market besides financial institution credits.

As Taiwan keeps on seeing its economy worsened by the recessive world economy, the real estate industry experiences a hard hit (Fig. 1). Driven by other malignant factors, we are seeing more and more construction businesses closures, a development that would mean severe damage to the economy (Wang, 2003), making assurance of sound financial and business nature of the construction industry and its affiliation a major issue to deal with.

Most of the local researches on real estate securitization focus on description and feasibility of introduction of international systems and discussion over regulation and tax; few are about the benefits and disadvantages of the system from financial and legal perspectives. How will real estate securitization benefit the construction industry? What would the construction industry do and is it willing to go ahead? What is the real operation mode of real estate securitization? We do not have many researches available in these regards and even less for the construction industry. Accordingly, we try to check the real impacts of real estate securitization to the construction market.

Purpose of the Study

The research is to achieve the following objectives by discussing the impacts created by real estate securitization on the construction industry:

(1). Comparison of the real estate securitization systems in Taiwan and overseas. Building an operational model on the local real estate securitization mode.

(2). Discussion of the short, mid and long-term impacts created by real estate securitization on Taiwan construction market.

Methods of the Study

The research is conducted using the following approaches:

(1). Reference literature review: Discussion of literature regarding development, current condition, and system of real estate securitization of Taiwan and that of other countries. Comparison of the operation model of Taiwan and that of international real estate securitization.

(2). Building and analyzing models: Discussion of basic elements, flow process involved in building a real estate securitization operation model aiming at successful real estate assets trusteeship (REAT) and real estate investment trusteeship (REIT).

(3). Case analysis and model demonstration: Analysis of basic elements, operation flow process, and capital flow in a case study for a successful comparison of the basic data with the operational model for feasibility of demonstration model.

A Study on Real Estate Securitization in Taiwan and Overseas

In this chapter, we will discuss definition and characteristics of real estate securitization, the studies on real estate securitization in other countries, and development real estate securitization cases.

Characteristics of Real Estate Securitization

Real estate securitization means the conversion of the investment in real estate into securities, assuring that between the investor and the premise, the direct right to property is converted into securities that resemble a right to debt. The practice is to make the real estate market merged with the capital market assuring that the value of the real estate is converted from fixed capital to mobile capital securities as an expanded investment.

The term securitization is also understood as the issuance of securities by the initiator to demonstrate the value. By securitization, the initiator has the direct right to the premise converted into a certificate of possession, a certificate of indirect possession of quasi right to debt.

Securitization also involves certification, minimization, specification and mobility as factors in raising fund for investments in an open market in the form of securities. This is to say, to raise required fund for investments by issuing securities. Accordingly, the term real estate securitization shall have the following characteristics:

(a). Less investment amount: For the lower amount of investment in the products, real estate securitization may have financial products that resemble stock, bond, futures and others of like transaction volume.

(b). More investment units: Like real estate premises that are available by building, by level and by unit requiring fewer investment units, real estate securitization may be available in more investment units.

(c). Open operation: Real estate securitization may have the products open to all investors.

(d). Full-time management: Real estate securitization raises funds of all amounts for operation and management by a full-time agency.

(e). Faster fund-raising: As the fund for real estate investment comes from financial institution loans, when the financial institution becomes unable to provide the required amount, real estate securitization may raise the fund from the capital market in a direct and rapid fashion.

Other Local and International Studies on Real Estate Securitization

REIT in the U.S. was born in 1960 and it acts as mutual fund that raises fund from the public by issuing shares or beneficiary certificates. The premise of the investment is something the minor investors would not otherwise have access to. It's the fund made available by the public that allows the minor investors to own substantial properties that keep on growing in value and benefits.

REIT in the U.S. is available in equity type, mortgage type and hybrid type depending on the nature of investment. In terms of organization, there are corporate type and contract type. and in terms of redemption, there are closed type and open type.

For Japan, in opening its own real estate securitization market, Special Purpose Company, SPC, was amended in 1998 and in 2000. The Securities Investor Corporate and Securities Investment Trusteeship Code was revised as Investor Corporate and Investment Trusteeship Code and Special Purpose Company, SPC, was amended as Assets Mobility Code, assuring that the Japanese version of real estate securitization is of both Assets Utilization type and Assets Mobility type.

In Taiwan, the real estate securitization is constructed in 2 styles:

(1). In Real Estate Investment Trusteeship, the empowered agency is to locate a premise with stable yield and by raising fund from both unspecific and specific individuals, the fund is converted into beneficiary certificates that are delivered to the investors with designated yield of the property in trusteeship, of which the interests or other benefits are delivered to the investors.

(2). In Real Estate Assets Trusteeship, the owner or the title of the property transfers the rights of the property to the empowered agency and the owner or the title remains as the original beneficiary and the right of trusteeship of the trusteeship is then securitized by the empowered agency which, when necessary, may issue beneficiary securities of different types, terms or liquidation priorities.

Development Stock

In Taiwan, after passing its real estate securitization regulations and as incentive to the real estate market, the legislature becomes committed to the study of feasibility of development securitization. Real estate now drives the securitization regulations for ordinary development cases with new urbanization projects, but the large number of development types implies many risks of uncertainty. At this time, the Real Estate Securitization Regulations in Amendment remains in discussion in the legislature.

In Japan, where a similar legislation environment governs in the aftermath of the evaporated economy, to launch real estate securitization, its legislation tends to cope with the development type. Different from ordinary real estate securitization, in the early stage of development, there would be no movement of cash and the investor is to take the risk of the development, though its return is much higher. As business drops or when the builder is in lack of fund, the practice of turning to the public for fund raising is a major alternative. (Chen, 2007)

The development type of securitization has gone booming in Japan in recent years. Both Roppongi and Akihabara in Tokyo are good examples. The 2 projects involve office buildings, commercial facilities and segmented apartment buildings on Assets Mobilization Code. Besides, in Special Purpose Company, SPC,

non-recourse loan securitization is allowed that assures the transfer of loans to development cases to brokers as a way to alleviate the burden of the developers. (Zhang, 2004)

In Japan, the investment in development type of real estate comes in 2 stages. Stage 1 is the construction stage, with successful land access and construction of buildings on the premise. This first stage consists of land access, start and completion of work. Stage 2 involves the plan after completion of the construction work, such as leasing management with benefits assigned, transfer of rights, and transaction among others (Kubota, 2000). As shown in Fig. 2, of the total cost of ¥270,000,000,000 for the Roppongi New Town, some ¥10,000,000,000 was contributed by the affiliates to the Mori Group and the rest by the investor banks and private financial institutions coordinated by SPC.

The value is assigned in rights sector, reserves and lease sector (beneficiary area). The rights sector is assigned to the titles of the lands and reserve to the investors with assurance of flexible operations and management value-adding plus the parking that is shared for conversion of rights without toil. The lease sector (beneficiary area) is compiled and used in such a manner for management fee of the housing; in the area, most of the properties are residence and building for lease.

Updates of Real Estate Securitization in Taiwan and Overseas

The statistics delivered by U.S. REIT Association suggests, as of late December 2007, a total of 153 operators were in business for a total value of US$312,000,000,000, of which 118 are Equity type operators for US$288,600,000,000, at 92.5% of the total value of REITs; 5 are Hybrid type,

for a total value of US$4,200,000,000. The figure reflects the latest development and scale of assets of the U.S. REITs.

In the statistics delivered by the Tokyo Stock Exchange in Japan of late April 2008, there are 42 operators of J-REITs, which come in Assets Movement type and Assets Mobility type. Assets Movement type operators conduct their management like securities investment trust fund. Before 1988, Assets Mobility type operators were known as mobilized operators for the lack of real estate securitization law in Japan, where securitization on land trust type was not considered as part of the securities exchange market. By then, the commodities available were land trust, minimized real estate commodities, residence loan debt trust, and residence mortgage certificate and mortgage bond among others.

When Taiwan had its Urbanization Renewal Regulations approved in October 1998, real estate investment trust became part of the new system, which served as origin to the legislation for real estate securitization. In May 1999, the authority of finance announced Code for Monitoring and Management of Urbanization Renewal Trust Companies and Code for Utilization and Management of Urbanization Renewal Trust Fund Raising, 2 by-laws, to assure successful implementation of the urbanization renewal investment trust. In July 2003, the legislation approved the regulations for real estate securitization, which was based on real estate investment trust and real estate assets trust, like real estate investment trust, land trust in the U.S. and assets mobility in Japan.

As of late June 2008, Taiwan Real Estate Securitization Market has seen 8 REIT cases (7 listed and 1 'PO) and 16 real REAT cases. Most of the REIT cases are with the premises located in northern Taiwan and only the Tainan Sinkong

Mitsukoshi of Sinkong No. 1 is located in southern Taiwan. Most of the investments are in office buildings, of which 2, the Cathay No. 1 and Keethay Star include hotel facilities.

Operation Models of Real Estate Securitization

After reference literature review and comparative analysis of Taiwan and international real estate securitization systems, the real estate securitization models (Fig. 3) are of 6 structures given as follows.

(1). Basic elements to main body: the main body is established for construction, real estate, insurance and construction among other activities (consignor): the establishment shall be confirmed by a trust contract signed by the consignor and the consignee (trustee); the main body shall be the real estate investment trust or paper company.

(2). Basic elements to fund raising: Listing/IPO shall mean main bodies of issued beneficiary securities; the stock exchange shall be available for free transactions of beneficiary certificates issued by real estate investment trust; capital shall mean transactions carried out on beneficiary securities in the stock exchange for fund raising; credit shall mean credits offered by the consignment bank or loans from financial institutions for fund raising.

(3). Basic elements to real estate properties: Properties shall mean construction, real estate, insurance and properties of like value made available by the construction industry: Real estate shall be high-value hotels, large shopping malls, office buildings and other properties.

(4). Basic elements to capital utilization and management: Investment shall refer to the use of the fund in the form of investment and credit granted by financial institutions in real estate investment; yield/rent shall mean yield and rent from investment in real estate; shares allocated shall mean benefits to trust allocated to investors; taxation shall mean the 6% on income by interest levied by separate and interest shall mean the interest on the yield to pay to financial institution credits.

(5). Basic elements to the use and management of real estate assets: the agency for utilization of assets empowers the fund manager to take care of the operation and management; Utilization, the fund manager shall prepare development of management plans for the real estate of the trusted investment; contracted operations shall mean the fund manager have all operations, management and safeguarding businesses per the development and management plan prepared by the fund manager to real estate operation manager and trust banks; assets management shall mean the real estate company carries out building maintenance, contracting sound tenants, improvement of yield of real estate and others; trusted assets management shall mean that the trust bank is responsible for the safeguarding of the letter of rights and change of titles.

(6). Basic elements to business opportunity: Businesses desiring to use real estate without possessing them shall mean operating real estate for profits without owning any, mainly retail businesses and hotels; Properties to sell for development shall mean developed constructions, real estate without being properly managed; To sell all properties shall mean to get rid of some properties to keep business in shape and for capital available.

Case Study

Here, we only discuss physical cases of IPO or listed businesses, which are analyzed of key elements and the basic

elements to establish the model units for comparison (Table 1), demonstration model and case difference for reference of model revision and feasibility study.

Case (1): CHIA HSIN Wanguo A, B Case Analysis

(1). To the investor, the interest on assets trust beneficiary certificate goes from 2.3% to 2.6%, much higher than the financial commodities of fixed yield available in the market, and is subjected to lower duties.

(2). Released by this case, CHIA HSIN Co. is to have access to funds at lower cost, the floating interest rate risk varies depending on the nominal rate of the beneficiary securities.

<div align="center">

Case (2): Cathay No. 1 REIT Case Analysis

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(1). The premise assets enjoys an annual lease rate of 100% and the rent goes at NT$ 727,000,000.

(2). The investment trust fund in question is the first fund in Taiwan of over NT$10,000,000,000, with a slightly different portfolio than that of others and the affiliation of Sheraton Hotel makes it remarkable as the hotel is one of the premises.

(3). Taiwan Ratings believes Cathay No. 1 REIT opts for a conservative finance strategy and sets the gearing ratio (total loan against total assets) at not more than 25% and it uses no loans for the expansion of the scale of its investment portfolio, making its assets quality relatively safe.

<div align="center">

Case (3): Fubon No. 1 REIT Case Analysis

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(1). Investor structure: Individual investors at 60.17%, where most investors are of between NT$1,500,000 and NT$3,000,000. As of paper companies and local banks, documents, life insurance and marine insurance companies, the capital total NT$3,000,000,000. Foreign investors, local large company acquisitions total more than NT$1,000,000,000.

(2). With the building at a lease rate of almost 100%, annual rent totals NT$2,600,000,000.

(3). In the first 3 years, the fund was used by the investors as key means for stable income by rent, when Year 1 made the investors see a yield rate at 3.85% and in Year 2, it went up to 4.63% and slight growth is predicted for year 3.

The comparative demonstration shows the indexes in the key frame of the operating model: Fund raising means that real estate securitization is a popular, unitary and highly mobile credit means. Establishing main body means availability of a transaction bench for real estate transactions of large sums allowing activation of the value. Contracted operation management indicates that when the local construction industry, a capital and labor-intensive manufacturing activity, is upgraded to a know-how and technology oriented construction service industry, new business opportunities are created for the construction industry.

<div align="center">

Conclusions

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In the research in question, the international operation mode analysis is compared to the operation mode and, thanks to the case comparison of operation modes and demonstration of feasibility of the models, the discussion of the impacts of real estate securitization on the construction market are concluded as follows.

(1). Upgraded use of fund: the real estate investment operator has access to capital from the capital market thanks to securitization for maximal participation and involvement on one side while increasing fund movement in effective use.

(2). Sound real estate market functions: the real estate investment operator hires experts of assets managers to make the construction market become stable while optimizing the market functions.

(3). Increase of premises for future real estate investment: Except for commercial purposes, such as hotels, shopping malls, everything could be premise for investment by real estate securitization in the future.

(4). Upgrading of management of construction industry: Thanks to real estate securitization, the local construction industry is concerned about development, planning and construction capabilities of the team and disregard quality, facilities and cost of real estate. Sound operation capability is key to successful construction industry.

(5). New business opportunities for construction industry: Real estate securitization will accelerate in upgrading the local construction industry, making it a knowledge, innovation and technology-oriented construction service industry. Real estate securitization shall have its chain effect on the construction industry by introducing new business opportunities.

(6). Monitoring on approval of development investment bills: At present, the construction industry is highly interested in participating in real estate securitization and the development real estate is the only solution to the shortage of fund in the early stage of construction. Against the high risk of the type of investment, the return rate is high, too. To make the investor willing to stay, sound legislation and co-operative measures is a must.

(7). Selection of new investment premises: In the case studies, one of the premises involved in Cathay No. 1 is the Sheraton Hotel, a REIT property of full occupation almost all the time. The overall rent and investment return performs much better than the rest of the case and, with the cross-strait links and open tourism policy, demand for hotel rooms will surely grow. Those who like to make investments in the construction industry may follow the real estate securitization specifications and choose a type of hotel for investment.

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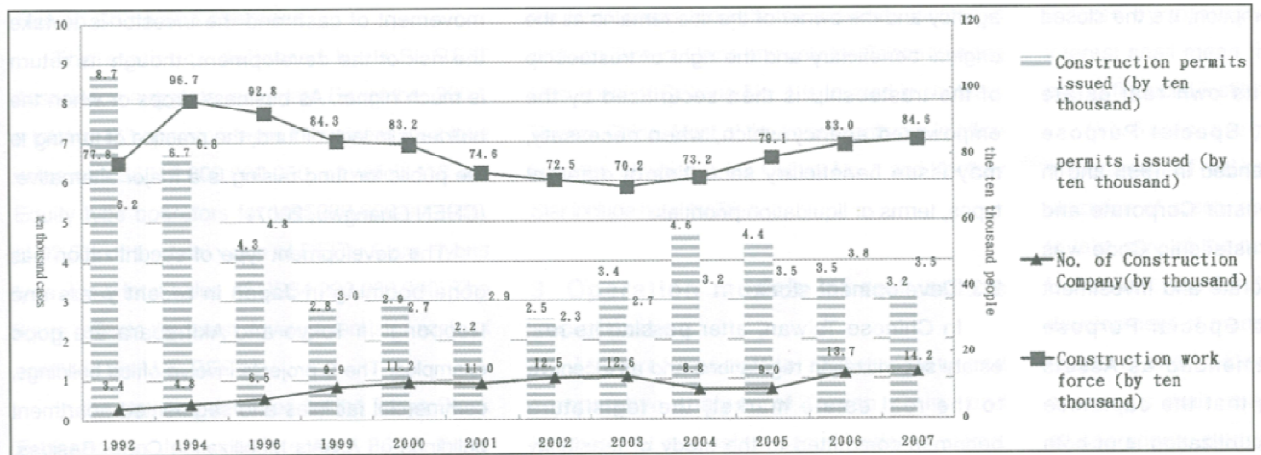
Courtesy: Statistics Report by Directorate General of Budget, Accounting & Statistics, the Executive Yuan,
Annual Report on Construction Statistics by Construction & Planning Agency, Authority of Interior

Figure 1. Number of Manufacturer, Work Force, and Construction Permits and Occupation
Permits Issued in the last 15 Years

Table 1. Comparison of Real Estate Securitization Cases & Models

No.	Basic model element	Basic case element	Case 1	Case 2	Case 3
1	Establishing main body	Initiator	CHA HSIN	Cathay Life Insurance	Fubon
2	Main body	Securitization	Real Estate Assets Trust	Real Estate Assets Trust	Real Estate Assets Trust
3	Assets operator	Consignor	Taipei International Bank	Chinese Taiwan Land Bank	Chinese Taiwan Land Bank
4	Securitized real estate	Type of assets	Office	Office, Shopping Mall, Hotel	Office, Residential Building
5	Operation Management Co.	Real Estate Manager	CHA HSIN	Cathay Construction	Fubon Construction
6	Stock Exchange, Financial Institutions	Dealer	Chinese Taiwan Industrial Bank Securities/Yuantai	JIHSUN SECURITIES	N/A
7	Fund raising	Fund raising	Public raising	Closed fund of public raising	Closed fund of public raising
8	To	To	Financial, insurance, retail, electronics	Financial, insurance, shopping, hotels	Financial, insurance, offices, dinning
9	Income by rent	Income by rent	NT$248,000,000	NT$727,000,000	NT$44,000,000
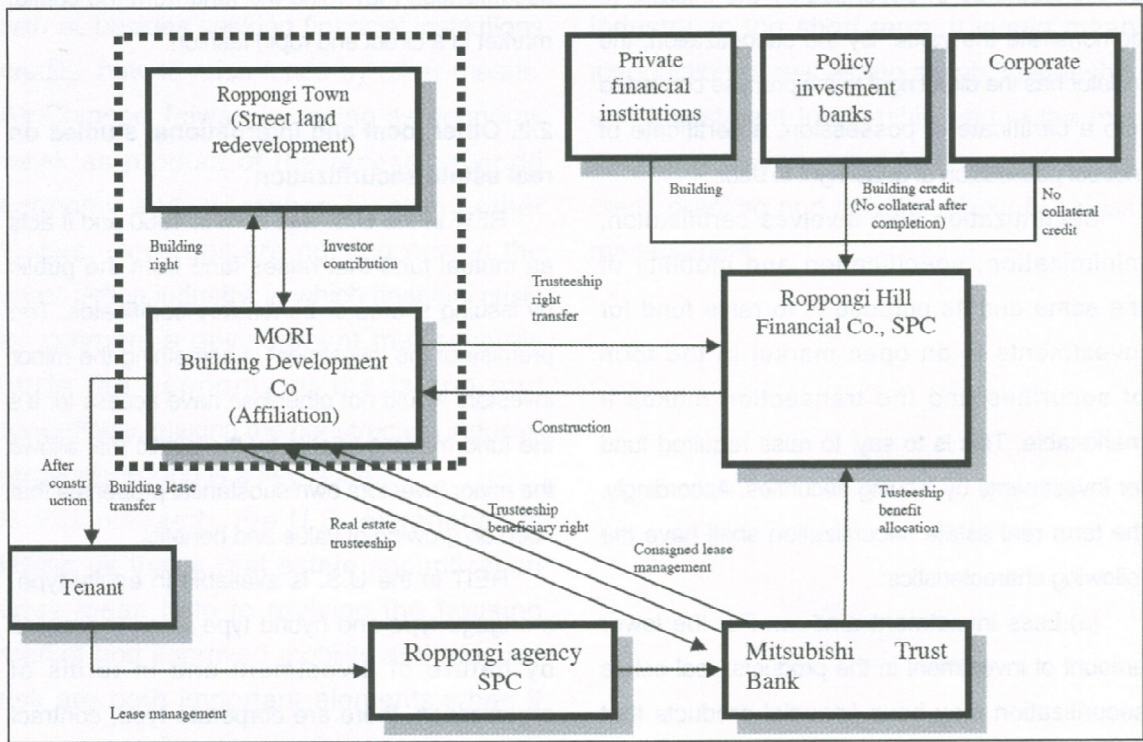
Courtesy: Revised and Complied from CHEN Guangwu, 2007; AKIRA UMEZU, 2005

Figure 2. Roppongi Real Estate Securitization Plan
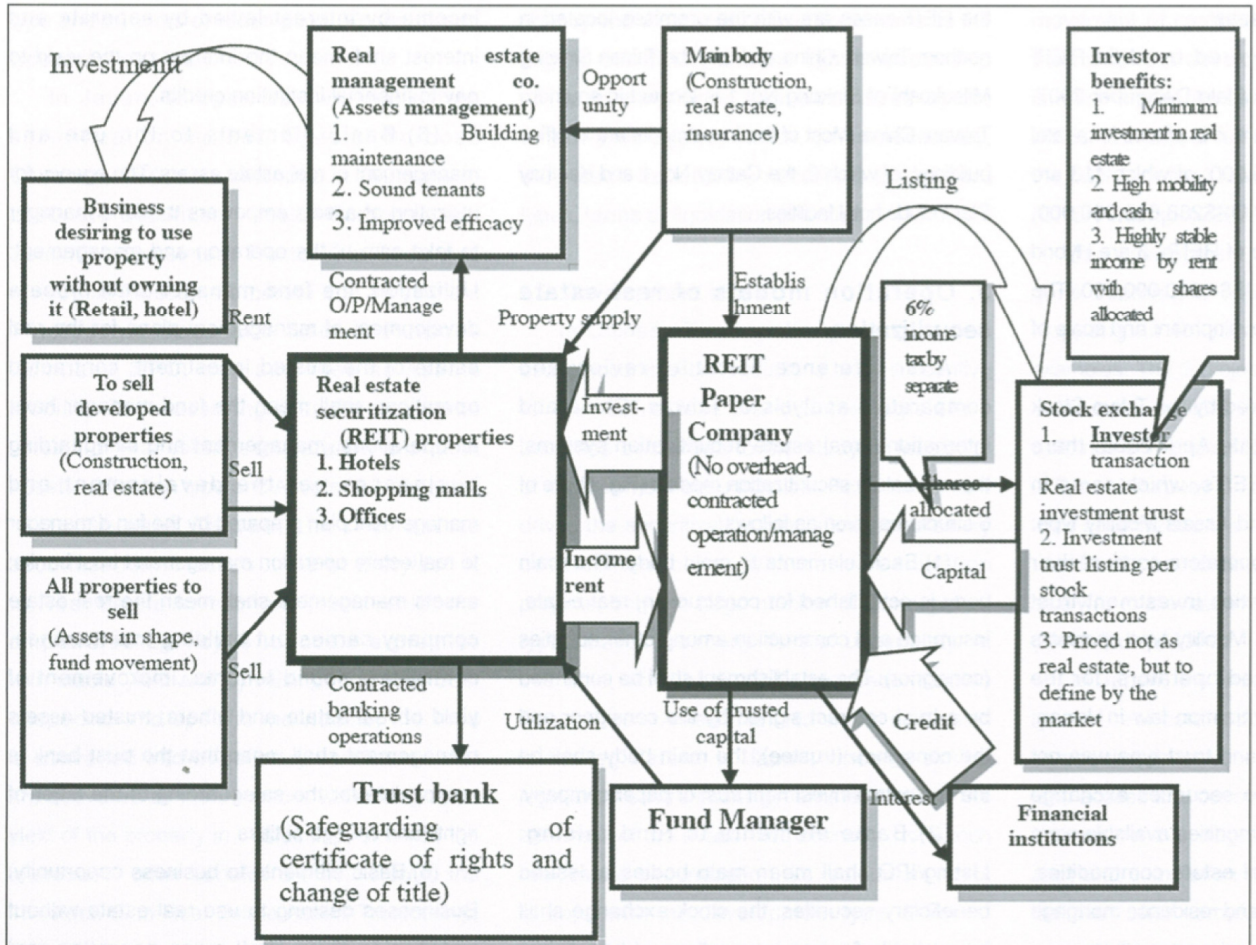
Figure 3. Framework of Operation Model of Real Estate Securitization
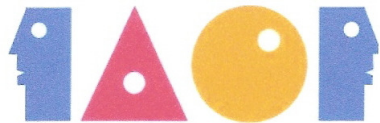
DRAMATURGY IN EMOTIONAL LABOR STUDIES: USE OF METAPHOR ANALYSIS

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Abstract

According to Goffman, the society resembles the stage in the theater and individuals are actors. For successful performances, individuals must cooperate effectively to others and express proper behavior in front of the audiences. The reason why individuals regulate their emotions to match the display rules is affected by social norms. Individuals comply with social norms to communicate with others in everyday life, whereas the prescribed display rules guide employees to interact with customers in the workplace. However, some performers interact with others properly, whereas some ones cannot. This article introduces the metaphor of Goffman dramaturgy to reveal the relationship between social reality and organizational life and outlines the metaphor analysis to review emotional labor studies. The purpose of this study is to explore how the metaphor analysis facilitates researchers to experience participants' inner feeling by linguistic expression, and thereby to assist employers in interpreting employees' behavior.

Key Words: Metaphor; Dramaturgy; Emotional labor; social reality; organizational life

Introduction

An early work of Erving Goffman, the Presentation of Self in Everyday Life (1959), asserted that individuals resemble stage performers and that their social interactions resemble theatre stage or dramatic text. However, individuals cannot perform onstage as particular character without the assistance and feedback from other performers. According to Goffman, successful performances are usually staged, not by individuals, but by teams, who share both risk and discreditable information in a manner resembling that of a secret society (Manning, 1991). Restated, audiences and performers must cooperate effectively to achieve successful performances.

An application of the Goffman dramaturgical approach by Hochschild (1983) indicated that the service provider evokes passion in soul of the consumer, but an employee is only acting as if he had feeling. She proposed that employees, specifically those in service industries, are like actors and that the service environment is their performing stage. They perform in front of audiences, which in this case is their customers. Actors only show their genuine feeling offstage. However, emotional performance at work in the context of paid employment is referred to as emotional labor (Hochschild, 1983). Emotions play an integral part of organizational life and are functional for organizations (Ashforth & Humphrey, 1995; Tsai, 2009). However, an organization is an epitome of social reality so that employees are like actors and perform with the other in organizational life. As such, organizational life provides a lens for reviewing and exploring social reality and the reasons why people behave and act on stage.

Although the dramaturgical metaphor reveals the relationship between emotional work and behavior in employees, most of works have applied quantitative methods to explore how emotions influence employees' performance (Allen, Pugh, Grandey & Groth , 2010; Diefendorff & Gosserand, 2003; Luthans & Davis, 1990; Morris & Feldman, 1996; Sutton & Rafaeli, 1988). Few qualitative studies have applied metaphor analysis to review the emotion. Lakoff and Johnson (1980) proposed that metaphors are pervasive in everyday life. Metaphors are more than just a linguistic embellishment because they tie though action together on a deeper ontological level in the conceptual systems of ordinary individuals. Although metaphor is unhelpful for revealing the generic properties of phenomena, it improves understanding of current society. The objective of the study was to elucidate the relationship between social reality and organizational life by applying a dramaturgical metaphor to study the effects of emotional labor in an organization. This study first discusses the relationships among dramaturgy, organizational life and emotion labor. Then, the Goffman dramaturgical approach and the perspective of Hochschild (1983) are introduced and used to investigate how social reality affects the behavior of stage performers and how metaphors can be used to interpret organizational life and employee emotions in future organizational studies.

Review of Literature

Dramaturgy, organizational life and emotional labor

In the work of Goffman (1959), the presentation of self or management of one's impression is the basis for his impression management theory. All individuals seek congruence between their self-concept and the feedback they receive from the social groups (Schulz, 2012). Goffman introduced the dramaturgy metaphor to describe an employee in an organization as an actor in a play putting on a show for others. Therefore, the audience

watching the play evaluates whether the actors have successfully portrayed their roles. If the individual is deemed successful by others in his or her role portrayal, then the individual may develop expectations of how he or she is to be treated by others in the future based on this role. In everyday life, individuals generally play the roles of both actor and audience simultaneously.

According to Goffamn dramaturgy, the stage includes a front and a back region. The front of the stage is comprised of both the actor's appearance (how the actors looks) and manner (how the actor behaves). The front region comprises stage props (e.g., desks for teachers or white coat for doctors) and appropriate facial expressions and role attitudes; however, the back is the private place in which actors rehearse and relax. The front and back regions are connected by a "guarded passageway" (Manning, 1991). Actors access the guarded passageway to relax and to comfort their emotions. Offstage is the audiences, who are watching the show and assessing the performance of the actors within a given setting. The performance of actors is created and perpetuated through social interactions with other actors in everyday life.

Goffman described life is like a play, and thereby individuals have endless opportunities to act with others during social interaction. Therefore, individuals must be prepared to adjust their initial intentions based on the reactions of others. The reason individuals regulate their initial intention is to communicate effectively with others while living in the society. As such, organizational activities are one of plays in the society, and thereby employees have essential roles in organizational operations. Restated, organizational activities occur in the form of social reality. Since organizations are integral of the society, employees who work for an organization are expected to regulate their emotions in order to achieve the goal of an organization in a given situation.

In service industries, however, Ashforth and Humphrey (1993) argued that the display of appropriate emotion is emotional labor. These expectations result in feeling rules or norms that specify the range, intensity, duration, and object of emotions that should be experienced. Thus, Hochschild (1983) argued that employees who perform emotional labor must induce or suppress certain feelings to maintain the outward countenance that produces the proper state of mind in others. Whether employees conform by adjusting or suppressing their truly feeling when communicating with customers in the workplace, they are playing a role, and their behaviors and thoughts must conform not only with organizational rules, but also with social norms.

The role of emotion in the workplace has been a constant though often implicit theme in the organizational behavior literature (Ashforth & Humphrey, 1993). Gross (2002) divided emotional rules into antecedent- and response-focused emotion regulation. Antecedent-focused emotion regulation might take the form of reevaluating the situation so as to decrease its emotional relevance; however, response-focused should target response tendencies that have been produced once the emotion is under way. The view of Gross (2002) argued that employees actively regulate their emotions in situations that require them to cooperate with others, whereas Goffman and Hochschild focused on the importance of adjusting or suppressing emotions in cognition to communicate with the others.

In this study, Figure 1 shows how a play can be used as a metaphor for emotional labor in a service setting. The inner rectangle is the outlook of the play in a service setting. Employees and customers are the

main actors in the front stage. The front and back regions are divided by a curtain. In the front stage, employees must suppress their genuine feelings, and their behavior must comply with social norms and with organizational rules. In the back stage, however, employees can vent their true feelings. Here, employees also communicate with customers regarding service delivery and develop interpersonal relationship with their colleagues. The interaction between employees and customers affects the reputation of the organization. Customers simultaneously encounter many individuals who publicly assess customer behavior within a given setting. (See Figure 1. at the end of this article.)

Comparison of the Goffman and Hochschild perspective

Goffman perspective.

The interesting metaphor used by Goffman (1959) is that an employee is an actor in a play who puts on a show for others and who generally conforms to rules when "on stage." Goffman utilized dramaturgical terms such as stage, actor, performance, character, audience, and team performance to discuss and analyze his theory. Goffman used the term "impression management" to describe the first contact between the actor and the audience. Reflexivity of individual behavior through impression management allows the individual to improve decision making by learning from past behaviors. Hence, the first contact determines how the audience assesses the performance. The initial contact between the actor and the audience is also a rich resource for understanding role portrayal and role acceptance (Schulz, 2012).

In fact, Goffman investigated the general relations between individual and society and focused on the "self" as social production rather than on simply staging

the 'self' as a strategy for identity creation (Võsu, 2010). Goffman also argued that dramaturgy refers not just to the rules for composing dramatic work, but first and foremost to the dramaturgical principles of a theatre performance. The dramaturgy of social performance, then, refers not to a theatrically exaggerated or deceptive behavior. Rather, it refers to mundane, immediate, everyday communicative situations, including those in which individuals recognize that the purpose is to influence each other by applying different strategies of expression. That is, social norms affect the roles of actors and how audiences evaluate them, and the ability of the actor to identify with the role is developed and perpetuated through social interactions with other audiences.

The social sciences literature includes a study by Võsu (2010) in which the dramaturgical perspective was used to describe the individual as a dynamic agent in a social interaction with social scripts and norms that guide this action. From the methodological perspective, social encounters on stage are indeed more organized and conceptualized, but they may produce similar perceptions of social interactions. Therefore, the researcher may produce similar perceptions of social interactions to the flow of social life. Therefore, the researcher can use a theatrical model to analyze the flow of social life in terms of manageable dramas or role performances (Võsu, 2010). Hence, Schulz (2012) suggested that many other dramaturgical frameworks can be implemented in the future to analyze other areas and aspects of consumer behavior.

Hochschild perspective.

Hochschild argued that the Goffman dramaturgical approach shows that a certain amount of acting is always required in daily life. That is, everyone can be considered an actor playing a role. Consequently,

Hochschild (1983) used the term "emotional labor" to describe the management of feeling to create a publicly observable facial and bodily display. However, Ashforth and Humphrey (1993) asserted that emotional labor is an observable behavior involving the display of appropriate emotions for the purpose of managing emotions in an organizational setting.

Hochschild (1983) argued that some employers expect workers to present positive or integrative emotions to ensure customer comfort and satisfaction, which in turn promotes return business. The 'deep acting' or 'surface acting' that employees use to display proper emotions on stage is governed by social norms. Gosserand and Diefendorff (2003, 2005) defined surface acting and deep acting as emotional regulation strategies. Surface acting is the 'painting on' (faking) of affective displays, and deep acting is the modification of inner feelings to match expressions. Efforts to appear authentic (deep acting) should receive higher ratings than intentionally faking (surface acting), which should have a negative impact on ratings of affective delivery (Grandey, 2003).

According to the Goffman dramaturgy, the capacity to act on feelings depends on the occasion, not on the individual. The self may actively choose to display feelings to make an impression on others. That is, individuals tend to act behaviorally, not affectively. Hence, Hochschild applied the Goffman perspective to investigate the inner lives and emotions of service industry employees. In short, after applying the metaphor to analyze the world in which employees behave and think, Hochschild and Goffman applied the metaphor to review how individuals become involved in social reality and why individuals behave and think differently.

Dramaturgical Approach and Emotional Labor Studies

The dramaturgical approach used in another anthropological study by Lin, Yang and Chang (2000) used front and back stage metaphors to describe emotional rules of service providers. They showed how emotional rules and categories distinctly differ between employee staff with different job descriptions and organizational systems, e.g., between the frontline staff of a department store and the staff of a car dealership. Additionally, Harris (2002) applied the Goffman (1959) dramaturgical view to describe the public and private emotional labor of barristers. Harris (2002) performed interviews and an observational study to examine the emotional labor of UK barristers in the workplace. The analytical results showed that barristers used public emotional labor for emotional display in non-private contexts to meet client expectations. As such, public emotional labor may be viewed as the 'front stage' emotional labor of barristers. Barristers performed both deep and surface acting at front stage. Nonetheless, private emotional labor was found to denote barristers' emotional labor in private settings so that it was akin to what Goffman (1959) labeled 'back stage.' Specifically, the study showed that, during private counsel-to-counsel negotiations, barristers personalized their cases and acted out roles during discussions. In this regard, barristers performed surface acting to achieve their purposes. Therefore, Schulz (2012) used the theatrical metaphor in impression management to review consumer behavior and presented two case studies showing its applicability to consumer research. The analytical results confirmed that impression management processes are related to consumer behavior.

In summary, previous studies used a metaphor analysis to compare the inner feelings of individuals between the front

and back region. The comparison results reveal the relationship between individual behavior and social reality; however, there is a dearth of studies to discuss what and how social reality affects employees' behavior and thought in organizational filed. Armstrong et al., (2011) noted that a metaphor analysis allows researchers to examine the conceptual metaphors invoked by metaphoric linguistic expressions articulated by speakers to gain insight into their thought patterns and an improved understanding of a given topic. In this regard, the application of metaphors provides organizational researchers a new insight to review employees' thought patterns by comparison their linguistic expressions and inner feelings for full understanding emotional labor studies.

Methodology

Power of Metaphor

The world metaphor comes from the Greek verb metapherein, which means to carry from one place to another (Boozer, Wyld & Grant, 1992). In addition to their linguistic purpose, metaphors provide cognitive structures that can be used for as a heuristic for sense making, to make abstract concepts more concerns (Lakoff & Johnson, 1980). According to Gadamer (1989), the purpose of metaphor is to elucidate similarity in difference. Hence, metaphors reveal the correspondence between two different phenomena by simultaneously showing their similarity and difference (Grisoni & Page, 2010). Therefore, conceptual systems are determined mostly on a subliminal level by what people see and how they interact with their physical and social surroundings. That is, it determines their ontologies and the way they make sense of their word (Basten, 2011). As such, how people interpret their world determines their actions and how they judge their actions.

Metaphor, as a figure of speech, has three essential characteristics. The first is the transferring and substituting of words and phrases. That is, use of the word or phrase in an original way transfers its ordinary designation to something it does not ordinarily represent. The last step of the transference and substitution process is the use of analogy to indicate differences in likenesses, relationships, or identities between objects or experiences (Boozer, et. al., 1992). Hence, the goal of metaphor analysis is to gain insight into how the participants use conceptual metaphors, i.e., the socio-cognitive connections that enable them to relate one concept to another, by analyzing the linguistic expressions with which they are systematically linked (Armstrong et al., 2011).

However, the skillful user of metaphor recognizes the important role of metaphors in structuring how people unconsciously perceive themselves, their lives, and their environments. As such, metaphor analysis is a valuable tool not only for conceptualizing participants, but also for conceptualizing how they view their world. In this regard, some researchers suggest that unconscious perceptions, including both social and organizational perceptions, may be structured by metaphor in entire cultures (Lakoff & Johnson, 1980). Although metaphors are used in both everyday communication and in scientific discourse, all language is somewhat figurative (Cornelissen, 2005). Because they reveal generic properties of phenomena, metaphors are useful tools in emotion works of organizational studies.

Conclusions

Working with metaphors seemed to provide a safe enough way for us to progress our shared knowing and examine the
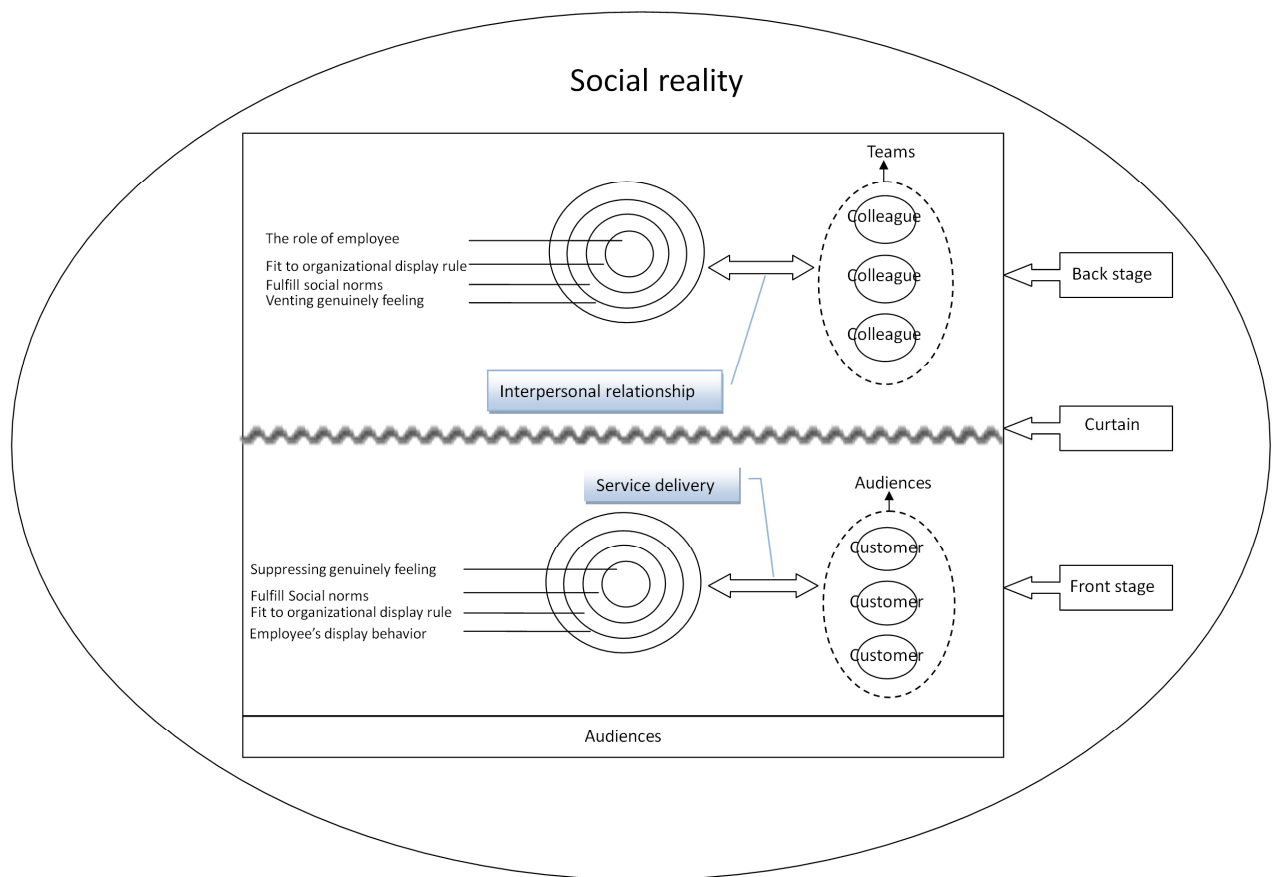
Figure 1 The play as a metaphor for emotional labor in a service setting

difficulties of our inquiry, in particular for the emotion work. Therefore, metaphors can be used by researchers to move beyond surface representational similarities and differences to facilitate a deeper reflection on the relational issues encountered by individuals (Grisoni & Page, 2010). Metaphor requires suspension of the ordinary frame of reference by viewing an aspect of the world 'as if' instead of viewing it 'as is' (Manning, 1979). In the view of Goffman, individuals understand life is like an endless play, they are aware of being actors in every place once the curtain pulls. However, individuals perform the role in cognition because they share their knowing and gain knowledge from others and from the society. Restated, if life is considered a journey, individuals must continuously interact with others throughout the journey.

Additionally, since the dramaturgical approach focuses on self-presentation and the management of self-impressions, the first contact between actors and audiences is important for establishing a positive image of the play. Likewise, Tsai (2009) stated that interaction between customers and employees generates certain emotions, which determine whether customers are loyal. Similarly, the discussion of this study suggests that the use of metaphors by employees to describe their emotions and to describe how they suppress negative emotions to achieve customer expectations incurs an organizational benefit. The purpose of this study was to provide an analy-

sis and explicit description of relationships between organizational life and social reality by using the dramaturgical approach to the empirical and conceptual domains in organizational research and by using metaphor analysis to explore employee emotions and behavior in the workplace.

Beal, Trougakos, Weiss and Green (2006) suggested that, since emotions and, consequently, emotional labor are dynamic, researchers should examine emotional labor in individuals over time. As such, researchers may continue to examine the inner feelings of individuals over time for an improved understanding of their emotional patterns. Ritchie (2003) also noted that, since a given linguistic metaphor has no single interpretation, applying the metaphor provides rich information about how participants conceptualize a given topic within a given situation. In this regard, this study applied the perspectives introduced by Goffman and Hochschild to review how metaphors can be used to interpret the behavior and thought of an individual not only in the society, but in an organizational filed. When using metaphorical expressions, however, abstract qualities may be used to personify inanimate objects, which then assume features or personalities that are more explicit than the original meaning of the word or phrase. As such, abstract qualities used to describe the emotions or behaviors of employees may be difficult to understand. Nevertheless, because emotions are an integral part of organizational life and function, application of metaphors improves communication by improving understanding of employee behavior (Ashforth & Humphrey, 1995; Tsai, 2009). Hence, the metaphor analysis facilitates researchers in using the power of language to understand how participants interpret their inner world, and thereby the analytical results are useful for human resource practitioner and employers to fully understand how employees behave and perform in the workplace.

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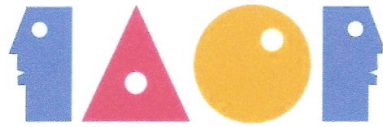
STRATEGIC IMPLEMENTATION OF INTERNATIONAL JOINT VENTURE IN TAIWAN: A CASE STUDY ON THSRC

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Abstract

Joint ventures (JV) have been extensively used worldwide by firms as a means to attain economic scale, lower risk, and experiences acquisition while selecting the right strategic alliance partners is regarded as one of the key success factors in joint ventures. To serve this purpose, many factors have been defined as the criteria for partner evaluation. However, one of the main concerns about partner selection is the difference of practice when dealing with construction projects across national borders. Studies on how to select an appropriate partner in Taiwan are currently in pressing need. Therefore this study aims to provide such a need. Through literature review, interviews for a case study, and questionnaire survey, this study starts with the defining of the strengths, weaknesses, opportunities and threats (SWOT) as found in the international joint ventures for public projects in Taiwan, and proceeds with analytic hierarchy process (AHP) to process the results from SWOT analysis further into a category group of four main groups with each category group comprising several factors. Meanwhile, the study uses questionnaire surveying to render the SWOT factors in quantitative values, so as to measure the relative weights of these factors, for revealing what strategies are taken by foreign firms in their selection of alliance partners and how domestic firms use joint venture opportunities to improve their strengths. Furthermore, analysis results by pair-wise comparison on the relations of SWOT factors of project management items (cost, schedule, quality and safety) and project cyclical stages (bid, design, construction and maintenance) are further used as the basis for analyzing how two partners in joint ventures achieve complementarities of resource contribution over different project stages.

Keywords: strategic alliance, joint venture, SWOT analysis, analytic hierarchy process analysis, Taiwan High Speed Railway.

Introduction

Since 1969, especially in 1975, Taiwan's government has opened its market to foreign firms. With the Government Procurement Act released in 1998 that ratifies the legal status of Joint Venture (JV), many large foreign firms with JV contracts are able to participate and invest in Taiwan's public projects. During the years between 1988 and 1994, JVs between foreign and domestic firms only amounted to 3 billion U.S. dollars. Starting in 1999, Taiwanese government has invited private firms to tender their bid for major public projects by applying B.O.T. (Building-Operation-Transfer), B.O.O. (Building-Operation-Owned) and B.O.O.T. (Building-Operation-Owned-Transfer). Foreign corporations from developed countries such as France, Japan, USA, and Germany have formed short term strategic alliances with Taiwanese firms to meet the demands of the proprietors while investing more than 40 billion US dollars in Taiwan's public projects, among which is the highest amount and the biggest BOT project worldwide – Taiwan High Speed Rail Corporation (THSRC). It is evident that in the last few years, public projects by JVs in Taiwan have become a trend.

JV projects, usually large in scale and technologically complex, involve construction time frames from a short period of three years to a long period of five, ten, or even more than ten years. Therefore, before applying JV, firms must search for an appropriate alliance partner from which they can acquire complementary techniques. Numerous studies have suggested that these firms actually benefit from the selection of a partner who can provide complementary techniques or competence that is expected to help the firm attain its strategic objectives (Killing, 1983; Harrigan, 1988). Partner selection might also influence alliance performance, as indicated by the findings of prior research (Tomlinson 1970, Killing 1983, Medcof 1997) that the choice of a partner is an important variable influencing JV performance, thereby highlighting the importance of selecting the right partner. A firm might make trade-offs between alternative complementary techniques or resources, and this concept is critical to success may be useful in overcoming this problem. These factors are determined by the underlying characteristics of the firm's industry (Luo 1997). Due to the geographical characteristic of the construction industry, several world class firms, such as Shimizu Corporation from Japan and Bilfinger and Berger from Germany, must form joint ventures with domestic firms to acquire project contracts. on one hand, this is due to government regulations; on the other hand, even if these world class firms have abundant capital and advanced construction technique, they must consolidate themselves with the management strengths of Taiwanese firms. Taiwanese firms are familiar with the environments for domestic construction and geography; the joint procurement of public projects will bring economic benefits for the firm. Comparatively, the limited economic scale of domestic firms contributes uncertainties to operations. Therefore, they must assess their strengths and weaknesses and form coexisting relationships with large firms.

While there are studies that discuss, on a broader scheme, the factors considered to be critical in an international JV setting (Li and Clarke-Hill, 2004; Al-Khalifa and Peterson, 1999; Wilson and Brennan, 2009), this study aims to discuss, through the specific case study, the general strategy of the company in choosing a partner for international JV operations. The decision on the seeking of complementarity could be examined by SWOT analysis (the strengths, weaknesses, opportunities and threats) for

each partner. Through pilot case studies discussion, citing the current biggest BOT project in the world as an example, and using SWOT analysis to investigate the factors of the strengths, weaknesses, opportunities and threats of participating foreign and domestic firms in the Taiwan High Speed Rail project, as well as applying Analytic Hierarchy Process (AHP) in the quantitative analysis of the importance of each groups and factors, this study aims to achieve the following purposes: (1) Analyzing the strengths, weaknesses, opportunities and threats and SWOT factors of both foreign and domestic firms to explain their strategies in searching for appropriate JV partners; (2) Analyzing the relationship of SWOT, SWOT factors and project management elements (cost, schedule, quality and safety) of both foreign and domestic firms; (3) Analyzing the relationship of SWOT groups and factors of project cyclical stages (bid, design, construction and maintenance) as a reference on how both partners achieve complementarities of resource contribution over different project stages. The research flowchart is shown in Figure 1.
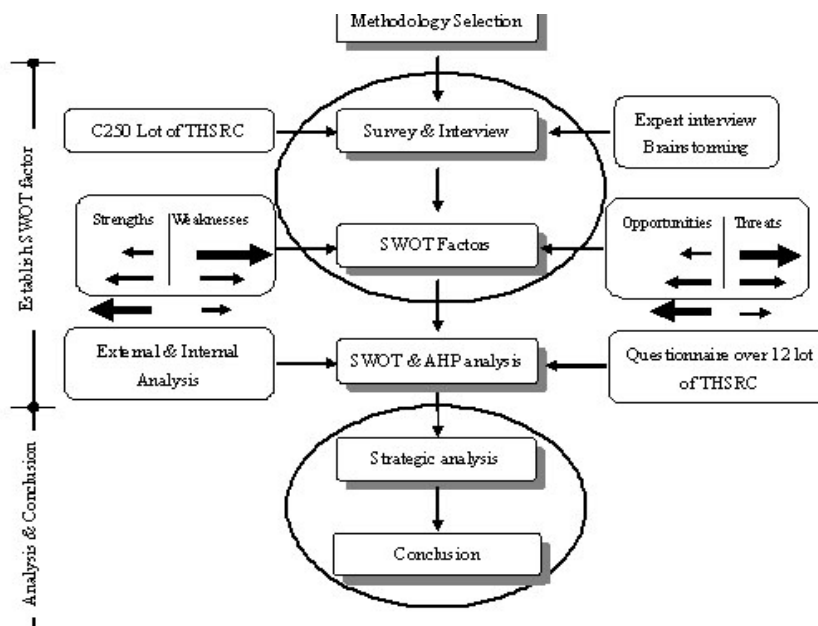
Figure 1. Research Flow Chart

Strategic Alliance and Joint Venture

James (1985) posits that strategic alliance is a mutually beneficial process where both parties depend on and keep their commitment to each other; and any change in a partner's benefits might weaken the alliance. Harrigan (1988) considers strategic alliance as a key strategic choice in considering a firm's decision-making strategy, to ensure, maintain or even improve the firm's competitive advantage. Killing (1983) points out that strategic alliance refers to two or more organizations that form alliances to achieve a common goal. Lewis (1990) states that strategic alliance results from the mutual needs and risk sharing of firms; thus, they cooperate together to meet a shared goal.

The advantages of JV cooperation in large scale public projects refer to lowering risk, achieving economic scale, saving on development cost, accumulating experience, improving technique and so on (James 1985, Harrigan 1988, Killing 1983, Lewis 1990, Derek and Derick 2003, Tam 1999), while its disadvantages are incurred also from the participation of its contractors, which include not only the obvious organizations of entrepreneurs, but also the invisible organizations of governments and nations (as shown in Table 1).

Table 1. Joint Venture as Viewed by Advantages and Disadvantages

Evaluation	Advantages	Disadvantages
Proprietor	1. Less managerial work for integration interface 2. Reduced project risk 3. More successful contracting	1. Concern over paperwork boycott 2. Concern over liability from job inefficiency 3. Vendor evaluation requires extra work
Joint venture contractor	1. More procurement opportunities 2. Higher cost estimation accuracy 3. More successful fund acquisition 4. Lower risk 5. Acquiring techniques and managerial skills 6. Learning the strengths of other contractors 7. Better project performance 8. Full utilization of idle resources 9. Eliminating unethical behavior of license imposture 10. Allowing partner selection by demand 11. Acquiring advanced techniques 12. Training for integration talents	1. Contractor cooperation hard to promote 2. Operation efficiency hard to improve due to provisional nature of organizations 3. Unequalled competence becomes obstacle for contractors 4. Contractors with financial problems 5. Contractors not duly fulfilling obligations 6. Increased operating cost 7. Complicated accounting practice
Government	1. Construction industry allowed more expansion 2. Contractors allowed international competitiveness 3. Reduced financial expenditure 4. Reduced project risk	1. Regulation or law changes 2. Interest rate increase 3. Volatile political situations

Before adopting JV, contractors must first assess their own characteristics and capabilities to seek for appropriate alliance partners and combine each other's limited resources and share the cost and risk. Yet, studies show that one of the most significant success factors is selecting the "appropriate" or "right" partner, "particularly when JVS involve a firm's core markets or techniques" (Tomlinson, 1970, Killing 1983, Harrigan 1988), since good partner can prompt the smooth progression of JV, change the category group in the strategic environment and lower the extent of uncertainty (Luo, 1997). Several empirical studies also have discussed partner selection criteria with research category group from various perspectives and dimensions (Tomlinson 1970, Tomlinson and Thompson 1977, Awadzi 1987) However, it can be observed from literatures of prior studies that the there is great difference in the partner selection criteria as observed in different countries with different extent of development, commercial traits, and benefits and traits of partnership; given the same selection criteria, due to the difference in priority, for instance, there is difference even in the selection of criteria. Therefore, the strategies on how foreign firms entering Taiwan's construction market as JV contractors deal with the selection of the

right partners, or how Taiwan's domestic firms use their strengths to become JV alliance partners will be brought forward in the study findings to be discussed below.

Research Methodology
SWOT Analysis

This study utilized SWOT analysis in examining the internal strengths and weaknesses, and external opportunities and threats factors faced by both domestic and foreign firms in Taiwan. There are differences in the weight and priority in the factors of the four groups (strengths, weaknesses, opportunities and threats), which may be due to the firms' trait, and market environments. To quantify the priority extent of the groups and factors, certain methods are required for verification. Therefore, this study also applied AHP to render in quantitative values the extents of priority of the four groups and factors, while allowing the results to be used as basic data in subsequent analysis.

Analytic Hierarchy Process

This study utilized SWOT analysis in examining the factors of strengths and weaknesses internally, and opportunities and threats externally that are confronted by both domestic and foreign firms in Taiwan (as shown in Fig. 2), while using AHP analysis to divide complicated data to be studied into relationships of hierarchical category group, and, after evaluation and analysis by opinions of experts, to show the extents of priority or contribution of the factors in each tier of the hierarchical group and factors so that there is a theoretically consistent criterion to check against the extent of consensus among experts, so as to allow the conclusion to be more consistent and objective, while the cumulative priority of SWOT groups and SWOT factors

represented in quantitative values can be used in subsequent analysis.

Industrial Background
External Environment

Despite of its great contribution to the domestic economy, the construction industry, more than any other industries, experiences limitations on its overall economy by the administrations of the government, which results in the instability of this market that fails to provide a sustainable environment for the firms operating business in it. For instance, the laws and regulations concerning the operation standards for construction industry are administrated by the Construction and Planning Agency (CPA) of the Ministry of Domestic Affairs, while business operation realm of firms is regulated by Company Act and Investment & Planning Act stipulated by the Ministry of Economic Affairs, and the need for funds is often influenced by the policies of the Ministry of Finance in their monetary restriction and relaxation adjustment in attempt to regulate domestic economy, which also shows the lack of comprehension and consistency in the policy-making and law-making of the government. Moreover, the shift in social value system also makes younger generation unwilling to join the construction industry, resulting in severe shortage of construction labor to such an extent that professional skills and experiences are hard to be carried on. The production value of the construction industry, for instance which has been declining since 1995 dipped down to a gross production value of 1.1 billion US dollars in 2005, accounting for only 2.15% of the gross domestic product (GDP), while due to the stagnant real estate construction and limited progression of major construction projects, the index for building-related
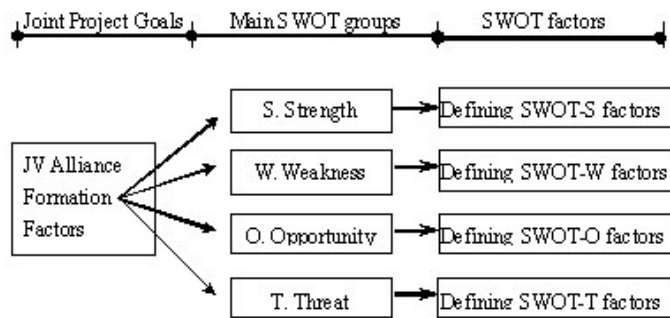
Figure 2. An Integrated Group Hierarchical Analysis

economy still lingered around the level of all time low in 2005. From this viewpoint, the overall economy of Taiwan's construction industry, is developing in a bearish trend, and in order to maintain project performance and prompt gross profit, firms are gradually reducing the revenue ratio of conventional projects, while switching to those for high-tech intelligent factories and environmental-friendly projects.

The world economy has since 1999 gradually recovered after the Asian financial crisis, with the growing starting to slow down in 2005, though at a rate not quite significant, while the growth is expected to be moderate for 2006 and 2007. Despite of ever-increasing energy prices, the overall economies in the US and Japan are doing well, while strong growing is expected. In the US, the economy remains strong, apart from oil price hike, federal interest rate increase, and hurricane disturbance which impose insignificant impact on the economy; over in Europe, the economy maintained steady growth, while the unemployment rate are gradually being improved; the economy in Japan, with economy-boosting measures being continuously implemented and the recovering economy of semiconductor manufac-turing industry, is slowly coming back up from the bottom. This strong

development of world economy are even more visible among foreign firms, particularly in their ventures overseas in developing countries, such as China, India, Russia, and Brazil, etc. With WTO accession, the contracting of various projects, the sourcing of labor brokerage, and procurement of major materials in Taiwan are all required to be made accessible for foreign vendors, and the possible impacts on Taiwan's con-struction industry may include the following: (1) deregulating the con-struction market to foreign investment (2) opening the market of domestic public projects, and (3) adjusting tendering procedures and operation modes, and so on.

In terms of operation scale, techniques required for construction and capital, the firms in Taiwan still lag behind their counterparts in Europe, Japan and the US; the entry to Taiwan's construction by these foreign firms, with their abundant financial supports, superior managerial and technological skills, are likely to cause great impacts on local firms.

Internal Environment Analysis

The advantages of firms in Taiwan, in terms of the practical aspect of operation, include the acquaintance with

local construction systems, the knowledge about domestic law and regulations, familiarity with the administration of local affairs, the acquaintance with the geology and weather environment, and so on, but the lack of clear, long or mid-term industrial policies has jeopardized the development of the construction industry, leaving such problems as the shortage of financial power, imperfect construction equipment, and even the lack of competence in research and development; the advantages of foreign firms venturing in Taiwan's market, in contrast, include customer proof construction performance, strong financial power and superb construction techniques, while facing great risk relating to such factors as different culture and language, inconsistent policies of the government and the fluctuation of currency exchange incurred by the world economy, etc.

Background of Case Study

The project for THSRC (Taiwan High Speed Railway Corporation) is by far the most significant policy for the Taiwanese government to prompt private

investment in the construction of infrastructure and public projects. The Construction and Operation Agreement (C&OA) was signed with the THSRC on July 23, 1998, by which THSRC was authorized to invest, build and operate by the BOT (Build-Operate-Transfer) mode. The authorization also extends to projects related to railway construction and operation (35 years after signing), train station development (35 years after signing) and business development in the vicinity (50 years after reclamation). THSRC has a total distance of 345 kilometers. The constructions officially began on March 1, 2000, and commence service after its completion on October 31, 2006. Project constructions include

land works, core electro-mechanical engineering, station construction, railway construction, site maintenance and station zone development. The THSRC construction is divided into 12 projects. Each project adopts the D/B (Design and Build) method to award contracts, and uses the JV model for construction (See Table 2). The main structures of the whole system include a total distance of 252 km of elevated railway bridges (73% of the total distance), 63 km of mountain tunnel or cut and cover tunnel (18% of the total distance) and road embankment/slope sections for the remaining 30 km (9% of the total distance).

Establishing Factors for SWOT analysis

After analyzing the construction industry by its internal and external environments and the background introduction by the case study, this study did a primary investigative interview with the C250 lot work project, to help establish questionnaire items. The Taiwan contractor is Pan Asia Corporation, and the foreign contractors are Germany-based Hochtief AG vorm. Gebr. Helfmann, and Ballast Nedam Corporation from Holland. Through collective brainstorming and pair-wise discussions, the domestic and foreign engineers from the C250 project have gathered and eliminated identical or similar factors, shown in Table 3.

In this survey, the expatriated engineers of the foreign firms also defined 28 factors in four SWOT groups, such as the strengths of "S1. The contractor is well-experienced", "S2 Sound financial support". The weaknesses of "W1. Not acquainted with local construction systems", "W2. Different culture and language", the opportunities of "O1. Increase market

share of workload in local construction market" and "O2. Undertake both local and major construction work", and the threats of "T1. Lack of raw materials or fluctuation" and "T3. The local legal system is not perfect".

Table 2. JV Biddings of Lot Construction for THSRC (by Domestic/Foreign Firms)

No.	Lot	Joint venture contractors	No.	Lot	Joint venture contractors
1	C210	Futsu (Taiwan)/ Obayashi (Japan)	7	C260	Continental Engineering Corporation (Taiwan)/ Bilfinger Berger (Germany)
2	C215	Futsu (Taiwan)/ Obayashi (Japan)	8	C270	Continental Engineering Corporation (Taiwan)/ Bilfinger Berger (Germany)
3	C220	Jiu Tai (Taiwan)/ Guo Kai (Taiwan)/ Daiho Corporation(Japan)	9	C280	IE&C (Taiwan) / Samsung (Korea)/Doosan (Korea)
4	C230	Chung Lin (Taiwan)/ Hyundai (Korea)/Zen Pacific(Hong Kong)	10	C291	Evergreen (Taiwan)/ Shimizu (Japan)
5	C240	Chung Lin (Taiwan)/ Hyundai (Korea)	11	C295	Evergreen (Taiwan)/ PEWC (Taiwan)/ Italian-Thai (Thai)
6	C250	Pan Asia (Taiwan)/ Hochtief (Germany)/Ballast Nedam (Holland)	12	C296	Evergreen (Taiwan) / Shimizu (Japan)

Survey Analysis

Survey Samples

The design of the questionnaire for this study is based on the four SWOT groups and the corresponding factors established described above (as shown in Table 3), and the subjects selected for this survey were the twelve contractors for the lot construction of THSRC projects (as shown in Table 2). After the survey results were compiled, 92% of the respondents were found to have 10 or more years of experience in engineering, while some respondents were found to be in senior management position. A total of 72 questionnaires were sent out, with 38 copies being returned with responses. To increase the credibility of analysis results, the criterion for the consistency index was set at 0.2 and, after such an adjustment, all the returned survey questionnaires passed the consistency

test and can be regarded as valid responses.

Factor Analysis

SWOT Groups and Factors for Domestic Firms.

The four SWOT groups established by the domestic firms in the first level are shown in Table 3, with relative weight ratio of 0.566, 0.196, 0.157 and 0.081 for SWOT groups of strength, weakness, opportunity and treat, respectively, indicating that strength, with weight ratio over 50%, is highly considered by domestic firms, far more than any other SWOT group, while the weight ratio difference between weakness and opportunity is not significant, and the threat group is barely considered in the decision-making for domestic firms.

As shown in Figure 3 and Table 3, domestic firms regard the strengths they possess as their best qualifications and the core competence in the competition. Through joint ventures with foreign firms, their benefits can be expected to maximize, and their weaknesses to improve in the meantime. However, opportunity factors are not regarded important, mainly because most domestic firms are small and medium sized in scale, and hardly engaged in any negotiation directly with foreign firms to acquire techniques or enter international market. Given the sluggish economy in Taiwan's construction market, it is necessary for domestic firms to rely on alliances with foreign firms to get big projects for public construction or to develop in different markets. The finding that threat group is not highly regarded also tells why the implementation of risk management is still hard for domestic firms.
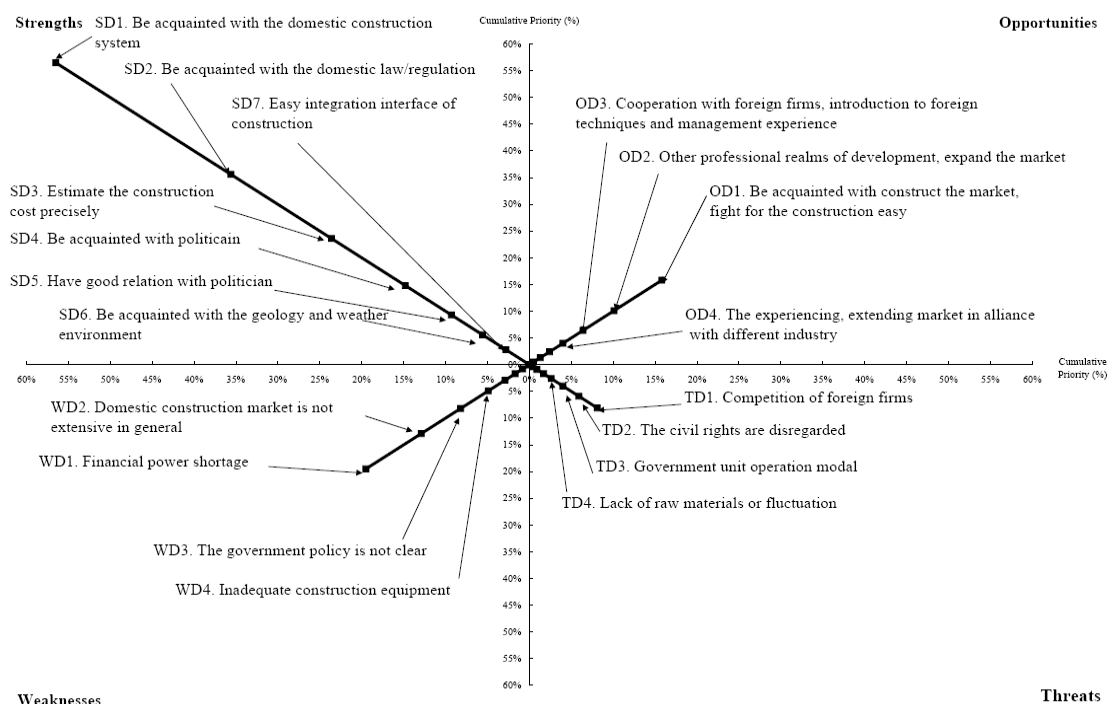
Figure 3. Graphical Representations of Pair-Wise Comparisons of SWOT Groups and Factors (Domestic Firm)

SWOT Groups and Factors of Foreign Firms.

The four SWOT groups established by foreign firms in the first level are shown in Table 3, with relative weight ratios being 0.579, 0.221, 0.132 and 0.068, for SWOT groups of strength, weakness, opportunity and threat, respectively, similar to the significance ranking by the domestic firms (of 0.566, 0.196, 0.157 and 0.566, respectively), with strength taking up over 50% of the weight ratio, followed by weakness and opportunity, while threat group is given the least regard by foreign firms.

Table 3. SWOT Groups and Factors

Domestic firms		Foreign firms	
SWOT groups	SWOT factors	SWOT groups	SWOT factors
SD. (0.566)	**SD1. Be acquainted with the domestic construction system (0.209)** [1]	SF. (0.579)	**SF1. The contractor is well-experienced (0.233)** [1]
	SD2. Be acquainted with the domestic laws/regulations (0.120) [2]		**SF2. Sound financial support (0.109)** [2]
	SD3. Estimate the construction cost precisely (0.088) [3]		**SF3. Strong management skills (0.077)** [3]
	SD4. Be acquainted with politician (0.055) [6]		**SF4. Fully equipped for construction (0.049)** [5]
	SD5. Have good relation with politician (0.037) [9]		**SF5. Skilled/experienced construction team (0.046)** [7]
	SD6. Be acquainted with the geology and weather environment (0.028)		**SF6. Strong design team (0.034)** [10]
	SD7. Easy integration interface of construction (0.028)		SF7 Arbitration experience (0.031)
WD. (0.196)	**WD1. Financial power shortage (0.066)** [4]	WF. (0.221)	**WF1. Not acquainted with local construction systems (0.058)** [4]
	WD2. Domestic construction market is not extensive in general (0.047) [7]		**WF2. Different culture and language (0.047)** [6]
	WD3. the government policy is not clear (0.033) [10]		**WF3. Not acquainted with local legal system (0.034)** [9]
	W4. Inadequate construction equipment (0.020)		WF4. Not acquainted with local custom (0.028)
	WD5. Lack support by domestic heavy industry (0.012)		WF5. Not acquainted with the norms of the domestic constructors (0.023)
	WD6. Lack ability for innovation, research and development (0.009)		WF6. Not acquainted with the domestic geology and weather environment (0.017)
	WD7. Shareholders with conservative mentality (0.008)		WF7. Not acquainted with government unit operation models (0.013)
OD. (0.157)	**OD1. Be acquainted with construction market, fight for the construction easy (0.057)** [5]	OF. (0.132)	**OF1. Increase market share of workload in local construction market (0.034)** [8]
	OD2. Other professional realms of development, expand the market (0.037) [8]		OF2. Undertake both local and major construction work (0.025)
	OD3. Cooperation with foreign firms, introduction to foreign techniques and management experience (0.024)		OF3. Establish popularity (0.021)
	OD4. Experiencing extending market in alliance with different industry (0.016)		OF4. Be acquainted with the domestic construction system(0.015)
	OD5. Enter global construction market through strategic alliance (0.011)		OF5. Flexible utilization of funds (0.014)
	OD6. Promoting company's image (0.007)		OF6. Building connections with political and business circles (0.012)
	OD7. Acquiring BOT practical experience (0.005)		OF7. Generate construction markets through strategic alliance (0.009)
TD. (0.081)	TD1. Competition of foreign firms (0.022)	TF. (0.068)	TF1. Lack of raw materials or fluctuation (0.018)
	TD2. The civil rights are disregarded (0.019)		TF2. Not in accordance with local firm's principle (0.009)
	TD3. Government unit operation model (0.014)		TF3. The local legal system is not perfect (0.010)
	TD4. Lack of raw materials or fluctuation (0.009)		TF4. The local firm tenders too cheaply (0.009)
	TD5. Competitor offering sweep-off low price in bid (0.008)		TF5. The civil rights are disregarded (0.007)
	TD6. Failure to upgrade techniques (0.005)		TF6. Lack of connections with politician (0.007)
	TD7. Inconsistent government policy (0.004)		TF7. Inconsistent government policy (0.008)

Note:
1. figures in brackets "( )" represent the overall weigh of cumulative priority of the group and factors.
2. Items shown in bold print represent top ten factors regarded as first priority by domestic or foreign firms. Figures shown in superscripts represent priority ranks.

As shown in Figure 4 and Table 3, foreign firms regard their strengths highly, relying on their strengths of experiences from multinational projects and sound financial support to venture into Taiwan's construction market while expanding their business territory, but have to rely on alliances with domestic firms to reduce their investment risk and other uncertainties, due to cultural difference and language barrier, and the lack of knowledge about Taiwan's construction market. The opportunity weight ratio did not turn out high, indicating the fact that project scales in Taiwan are not very extensive, and if foreign firms are to expand publicity to increase the opportunities for JV, the chance is not much. Furthermore, the finding of extremely low weight ratio on threat shows that foreign firms perceive no impact of threat or threat related factors on their decision-making on projects in Taiwan; moreover, given that almost all threat factors concern with government, it can be inferred that foreign firms are likely to rely to JV to transfer related risks to domestic firms. This will also be the strategy domestic firms are to adapt to acquire JV allies.
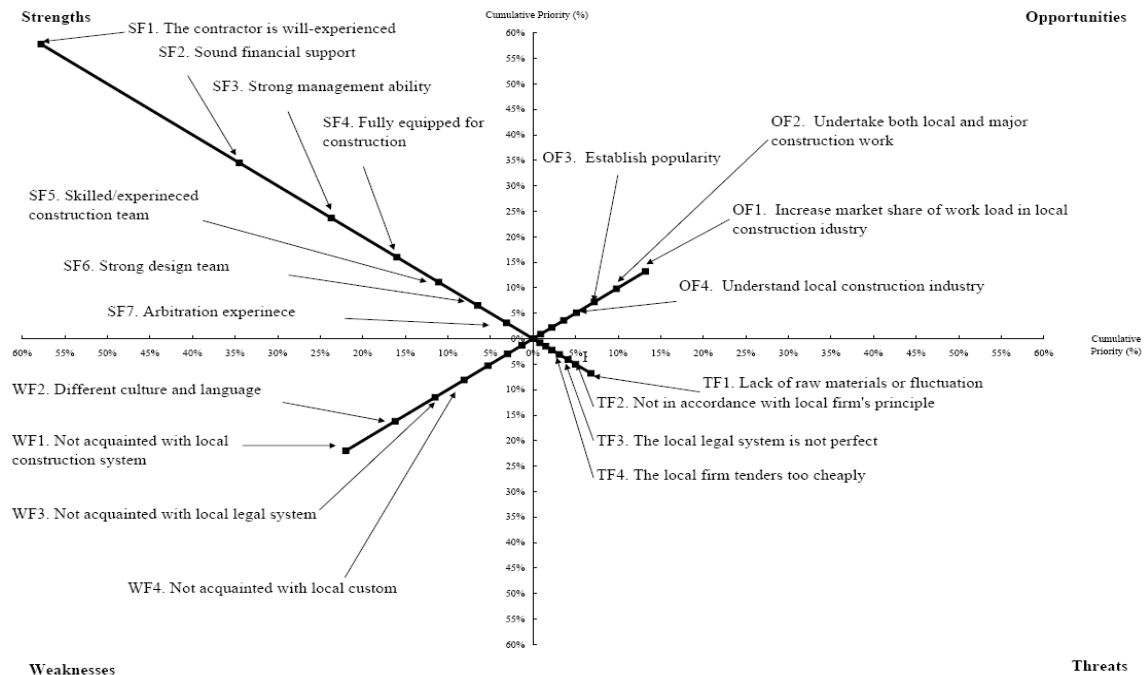
Figure 4. Graphical Representations of Pair-Wise Comparisons of SWOT Groups and Factors (Foreign Firm)

Analysis on Project Cyclical Stage Related Factors

Domestic Firms in Over Project Cyclical Stage.

As shown in Figure 5, the analysis by comparing the number of times a factor is regarded significant over the four project cyclical stages shows that the domestic firms regard construction stage the most, with more concerns over factors related to weakness and threat

factor groups, in contrast to only two strength factors referred for construction stage, "SD1. Be acquainted with domestic construction system" and "SD6. Be acquainted with the geology and weather environment", indicating that despite their high regard on construction stage, domestic firms lack the kind of ability of managing such uncertainties at construction stage as the factors of

shortage of raw materials, and the disregard of civil rights, etc. The design and bidding stages are respectively influenced by the lack of ability for research and development in the internal environment, and the lack of clarity in government's policy in the external environment, while the maintenance stage is apparently not regarded by the domestic firms.
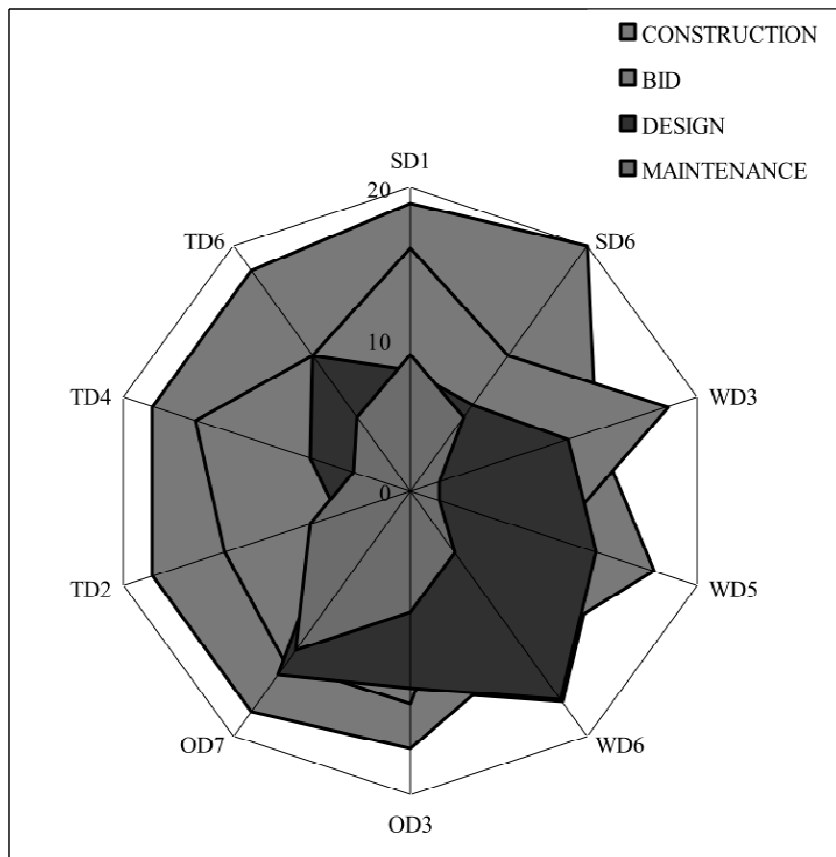
Figure 5. Project Cyclical Stage (Domestic Firm)

Foreign Firms in Over Project Cyclical Stages.

As shown in Figure 6, the analysis by comparing the number of times a factor is regarded significant over the four project cyclical stages shows that the foreign firms give more regards to

construction stage than any other project stage, with more concerns over factors related to strength factor group, indicating that foreign firms regard highly on domestic firm's competence in construction and the construction stage, while the concern over the bid stage relates to the factor of not being

acquainted with the domestic legal systems; they are certain of their research and development abilities in the design

stage, but foreign firms share similar concepts with domestic firms regarding maintenance stage relatively lowly.
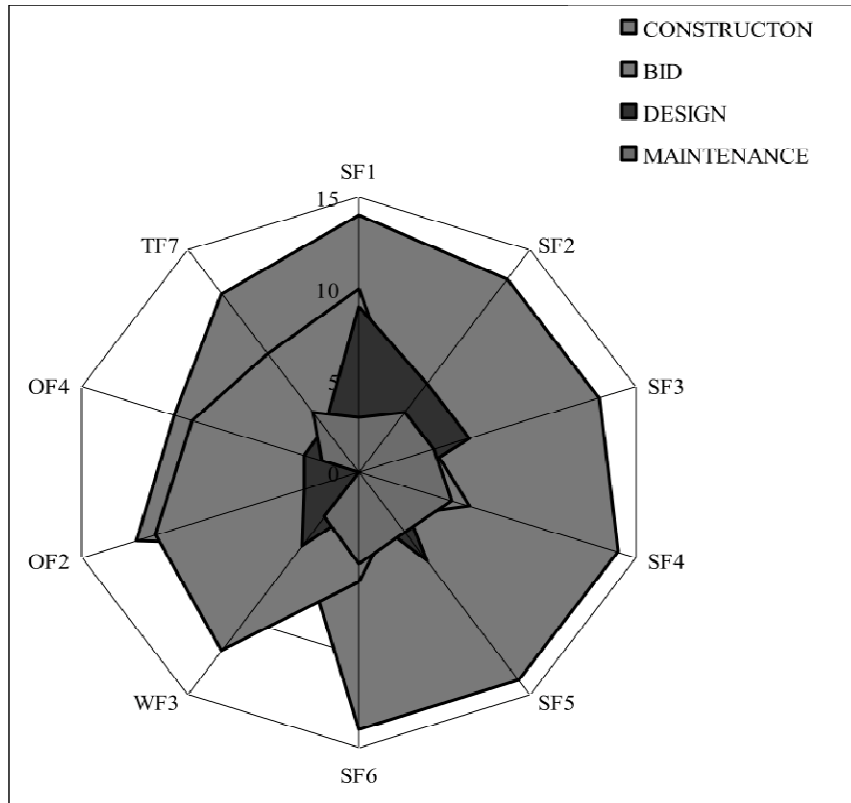
Figure 6. Project Cyclical Stage (Foreign Firm)

Analysis by Project Management Related SWOT Factors

Project Management Item for Domestic Firms.

As shown in Figure 7, among the four project management items, cost is regarded as of the highest correlation, with five out of the top ten factors being cost-related, including "SD3. Estimate the construction cost precisely", "OD1. Be acquainted with construction market, fight for the construction easy", "OD5. Enter global construction market through strategic alliance", "OD7. Acquiring BOT practical experience" and "TD4. Lack of raw materials or fluctuation".

Progress is correlated with three out of the top ten factors, "SD7. Easy integration interface of construction", "WD4. Inadequate construction equipment" and "TD7. Inconsistent government policy", while quality is correlated with two factors, "OD3. Cooperation with foreign firms, introduction to foreign techniques and management experience" and "TD6. Failure to upgrade techniques". Safety-related factors appeared to be regarded the least in terms of their correlation to project management. Among four SWOT groups, opportunity is most correlated with the cost item in project management, indicating that even though domestic firms regard cost highly, they do not possess the kind of strengths, and
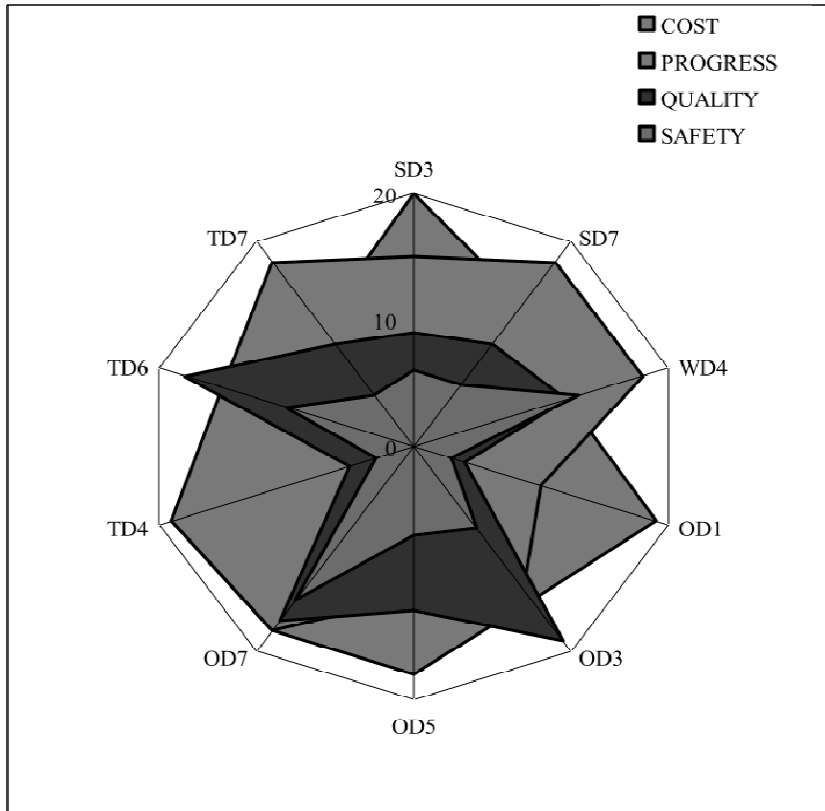
Figure 7. Main Issues in Construction Project Management (Domestic Firm)

the way for them to acquire opportunities and achieve their goals is to undertake JV projects.

Project Management Items for Foreign Firms.

As shown in Figure 8, among the four project management items, foreign firms regard cost as of the highest correlation, with seven out of the top ten factors items being cost-related, includ-ing "WF5. Not acquainted with the norms of the domestic constructors", "WF6. Not acquainted with the domestic geology and weather environment", "OF2. Undertake both local and major construction work", "OF5. Flexible utilization of funds", "TF1. Lack of raw materials or fluctuation", "TF3. The local legal system is not perfect" and "TF4.

The local firm tenders too cheaply", while progress is correlated with two factors, "SF3. Strong management" and "SF4. Fully equipment for construction", and quality is correlated with one factor, "SF1. The contractor is experienced". It seems foreign firms tend to overlook safety among project management items. Among four SWOT groups, factors related to strength and opportunity groups are most correlated with items in project management.
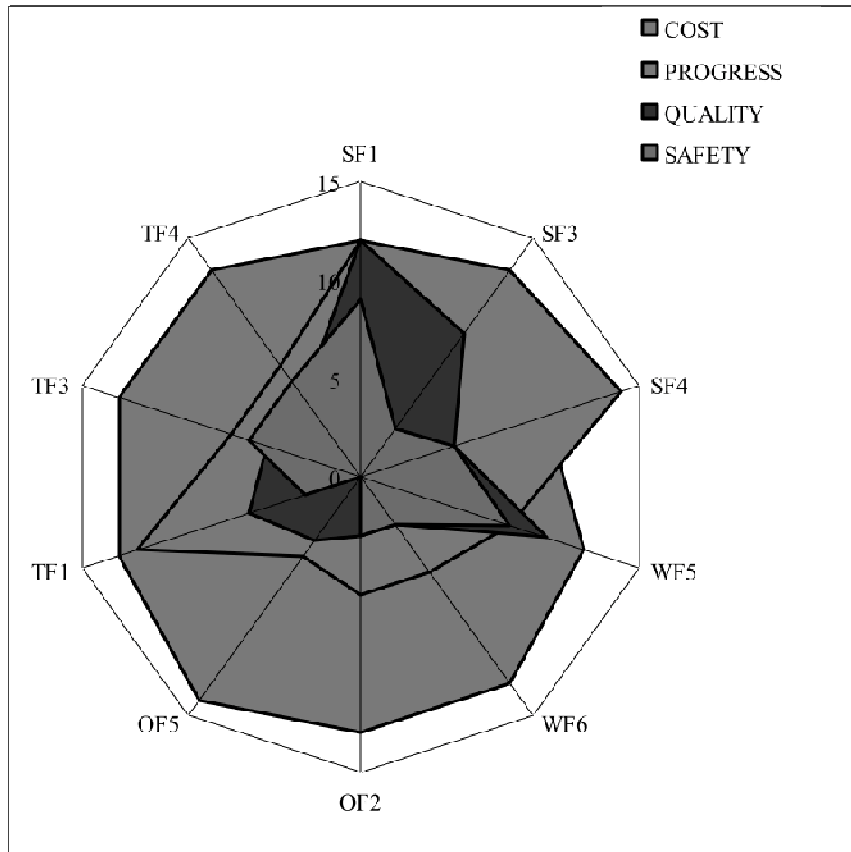
Figure 8. Project Cyclical Stage (Foreign Firm)

Conclusion

This study therefore uses THSRC construction project as a case study example, in which firms from such countries as Japan, Korea, Germany, Italy, the Netherlands, and so on, formed joint ventures with Taiwanese firms to contract THSRC project. A SWOT analysis was done on the THSRC C250 bid JV of domestic and foreign firms. Experts' interviews and group brainstorming have yielded the four SWOT groups and factors of domestic and foreign firms - strengths, weaknesses, opportunities and threats, which then served as the basis for the survey questionnaire content; With the 12 lot bidding projects serving as the subject of this survey, AHP analysis was applied to quantify the weight ratios of each of the SWOT groups and factors, thus allowing the first objective of this study to be achieved. Besides, strength with related factors are highly regarded factors by both domestic and foreign firms in JV alliance partner evaluation, while strength factors of one party, more often than not, are found to be the weakness factors or threat factors of the other party in an alliance; therefore, domestic and foreign firms should first evaluate the strengths of the other party to see if these strengths can help improve the weakness and threats of their firm, or help increase opportunities for their firms to benefit, or if the strengths

of their firms can provide commentary resources needed by the other party so as to enhance the feasibility of the alliance. Furthermore, the manifestation of the top ten factors show foreign firms have many distinct strengths to offer in their entering of Taiwan's construction market including such factors as possessing rich construction experience, adequate funds and strong management skills, and vice versa in the case of domestic firms, where strength factors of domestic firms are also the factors regarded highly for JV projects acquisition, thus allowing alliance with foreign firms to maximized benefits from both.

The pair-wise comparison of the four groups and 28 factors over project cyclical stage with project management items for both domestic and foreign firms can reveal how firms jointly achieve complementary resource contribution over different project stages or different project management items (See Figures 5 through 8), the second and third objectives of this study are thus achieved.

Foreign or domestic firms believe that in the course of project cycles, the strengths of a firm lie in construction and design stages, such as construction experience, adequate construction equip-ment or strong development and design abilities, but during the bid stage, firms are limited by not being acquainted with the legal system in Taiwan, and therefore in selecting a JV partner, domestic firms need to be evaluated by their strength in regard

of this factor. Conversely, even though domestic firms evaluate more factors related to construction stage, it is apparent that they tend to use JV as a means to acquire project opportunities, experience or techniques, and for that reason, their being acquainted with the geology and weather environment or with domestic construction system are also items of complementary resources for foreign firms, and become their qualifications in their bid for JV partnership.

By means of above mentioned analysis and findings, this study is now able to provide alliance partner selection basis for foreign firms using JV to enter Taiwan's construction market, while it also serve as a basis for domestic firms in their bid for alliance partnership with foreign firms. After the section of the appropriate or right partner, both parties should consult with each other and discuss on how to effectively utilize each other's strengths in order to create more project opportunities, while reducing threats and risks. Such a process needs implementing early on to allow possible conflicts to be eliminated, so that such characteristics of JV as swiftness, com-plementarity and effect multiplication can be used for the purpose of integrating the limited resources of each other, cost sharing and risk reducing, economic scale construction, complementary tech-niques contribution, the break-through for investment limitations and trade barriers, and vertical integration.

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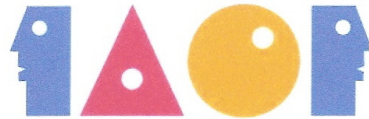
A STUDY ON THE CORRELATION BETWEEN FURNITURE PRODUCT KNOWLEDGE AND CONSUMERS' SATISFACTION BY FUZZY LINGUISTICS

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Abstract

This study was aimed to investigate the correlation between the furniture product knowledge and satisfaction of consumers by means of fuzzy linguistic and examine the relationship between them by means of Pearson correlation coefficient. In addition, Cronbach α and the multiple linear regression analysis were employed to explore the influence of product knowledge and consumers' satisfaction and establish appropriate regression equations. The research result showed that the fuzzy linguistics of furniture product knowledge and consumers' satisfaction were significantly correlated. Through the fuzzy linguistic mean equation, fuzzy linguistic was found to be between "agree" and "more agree." Furthermore, by the multiple linear regression analysis, independent variables, such as subjective knowledge, objective knowledge, and experience knowledge, were used to significantly forecast the fuzzy linguistic value of consumers' satisfaction.

Key words: fuzzy linguistics, product knowledge, consumer satisfaction subjective
knowledge, objective knowledge, experience knowledge

Research Background and Motives

The management of furniture enterprises currently encounters a rapidly changing environment. The internet era changes rapidly. When consumers select furniture in the market, they usually look for suitable products through their own understanding, information obtained from the external environment, and their experience of using similar products.

After the evaluation, they will use the product and further generate satisfaction at the product. Rao and Monroe (1989) argued that being familiar with the importance of product information, consumers having more product knowledge, they judge less by their stereotypes, and, instead, they tend to use intrinsic cues to determine the quality of a product, which further influences the consumers' satisfaction. Product knowledge has always been a critical issue in the study of consumers' behavior. Consumers' perception of furniture products exists in product knowledge; product knowledge is closely related to consumers' satisfaction and corporate profits. In terms of product knowledge, Rao and Monroe (1989) also found that product knowledge will influence consumers' evaluation. Scribner & Weun (2000) addressed that the quantity of product knowledge of consumers will influence the process of satisfaction perception formed by the attitude and further influence the following responses of satisfaction perception. Therefore, this study was aimed to investigate and understand how product knowledge influences consumers' satisfaction in order to help enterprises understand consumers' need and design furniture products which meet consumers' need, and, further, advance the operating performance.

Research Purposes

This study was aimed to investigate the correlation between the furniture product knowledge and consumers' satisfaction by means of fuzzy linguistic in hopes of providing the research result for enterprises, designers, and consumers as a reference. If the research result is employed by the research, development, and design department and the marketing department of a company as a reference, it will be helpful for the departments to understand the product knowledge of consumers, increase consumers' understanding of product knowledge, and satisfy the demand of consumers, and enhance corporate performance.

Research Limitations

In this study, the fuzzy linguistic of consumers satisfactions at furniture product knowledge was investigated from the viewpoints of consumers after purchasing and using furniture products. The samples were randomly selected from the consumers of furniture discount stores in Taiwan.

Literature Review

Furniture Product Knowledge

Consumers sort the concepts from diversified information, form furniture product knowledge, and remember it in their mind. Their perception of furniture product knowledge also influences their purchase of furniture products. Brucks (1985) addressed that when consumers select products, they usually search product information through the memory related to themselves and the products or make purchase decisions by means of relevant experience of using similar products. Therefore, different consumers usually have different levels of product knowledge of a product which will influence the satisfaction. Mazursky & Jacoby (1986) mentioned that the furniture product knowledge of consumers consists of the familiarity with furniture products and the professional knowledge. Hence, when consumers purchase furniture products, their own product knowledge tends to be applied to the furniture product evaluation and influence the satisfaction at the products. Brucks (1985) divided the definitions of product knowledge into three categories:

1. Subjective knowledge: the knowledge of products which consumers think they own, that is, the confidence of consumers in products.

2. Objective knowledge: consumers' real understanding of products, which is used to their actual perception of

product knowledge, namely the product knowledge that consumers actually own.

3. Experience knowledge: the experience of consumers in purchasing or using products, which is used to measure the product knowledge.

Consumers' Satisfaction

Woodruff (1983) argued that consumers' satisfaction indicates an immediate reaction that a consumer generates for the overall value of a product in a particular purchase or use. Fornell (1992) considered that consumers' satisfaction is an overall attitude based on experience. Thus, consumers' satisfaction depends on consumers' overall evaluation of all of their purchase experience in products or service, and it is the operating performance index of an enterprise. Anderson, Fornell & Lehmann (1994) brought up the overall consumer satisfaction, which indicates all of the experience of a consumer in purchasing or consuming a product or service and the overall evaluation formed by the accumulation of time.

Yeh (2005) addressed that consumers' satisfaction indicates the feeling of consumers that their requirements have been satisfied. Consequently, overall satisfaction is an accumulative construct summing up the satisfaction at a particular product or service of an organization and the satisfaction at different dimensions of

the organization. Therefore, it is a critical issue for enterprises to value consumers' satisfaction in corporate management and marketing at present.

Furniture Product Knowledge and Consumers' Satisfaction

Zeithaml (1988) considered that when consumers can only understand a product through the limited use experience before purchasing it, they will enthusiastically search the internal features of the product and try to link the product with the features, so internal clues become relatively important. Bolton & Drew (1991) considered consumers' satisfaction as the emotional factor generated by the post-purchase experience of consumers, and they were of the opinion that the factor may influence consumers' evaluation of service quality and post-purchase willingness and behavior. Engel, Blackwell & Minidard (2001) argued that consumers' satisfaction indicates that after using a product, consumers evaluate the consistency between the product performance and the pre-purchase belief. When considerable consistency exists between them, consumers will be satisfied. on the other hand, consumers will not be satisfied if their opinions on the belief in the product and the actual performance of the product.

Coulter et al. (2005) addressed that the product knowledge of consumers influences their purchase intentions, so when they understand a product more, their purchase in-

tentions will also increase. When consumers become more familiar with the knowledge of a product, their faith in and attitude toward the product will become better, so their purchase intention will increase, and the satisfaction will further increase. Hence, if furniture product knowledge is regarded as an important communication bridge between consumers and products, consumers' satisfaction will be directly influenced, consumers' understanding and use of a product will be influenced by furniture product knowledge, and the satisfaction will be further influenced.

Research Methodology

Research Design

1. Research Framework.

This study was aimed to investigate the correlation between furniture product knowledge and consumers' satisfaction. The research framework is displayed in Figure 1.

Research Hypothesis and Question

The research hypotheses are listed as follows:

Research Hypothesis H_1: the fuzzy linguistics of furniture product knowledge and consumers satisfaction are significantly correlated.

Research Question: the multiple linear regression was applied to the furniture product knowledge analysis in order to anticipate the fuzzy linguistic of consumers' satisfaction.

Questionnaire Design

The research questionnaire design was aimed to investigate the influence of furniture product knowledge on the fuzzy linguistic of consumers' satisfaction in Taiwan. The levels included respectively "strongly agree," "more agree," "agree," "disagree," and "strongly disagree." the first part of the questionnaire was the personal information of a participant, including gender, age, education background, and monthly income. The second part was the opinions of the participants about furniture product knowledge, including subjective knowledge, objective knowledge, and experience knowledge. The values of fuzzy linguistic respectively represented the following agreement: "0-1" indicated "strongly disagree;" "1.1-2" indicated "disagree;" "2.1-3" indicated "agree;" "3.1-4" indicated "more agree;" "4.1-5" indicated "strongly agree." the third part showed the satisfaction evaluations of the participants, which were based on the subjective feelings of the participants, after understanding furniture product knowledge. The representations of the fuzzy linguistic values were identical to those in the second part.
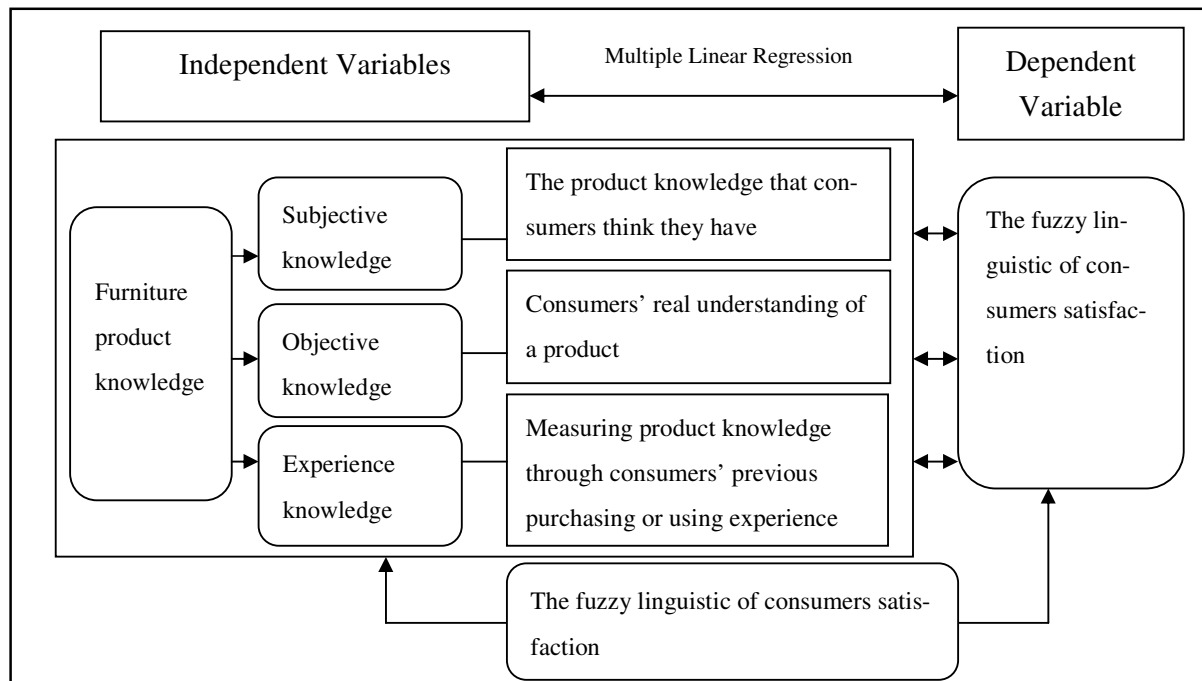
Figure 1. Research Framework

The Fuzzy Linguistic Statistics of the

Questionnaire Data

Matarazzo and Munda (2001) argued that traditional linguistic decisions were all limited to the use of triangular number, so they brought up the method of using the integration method to calculate fuzzy numbers, which are categorized into the following types: triangular fuzzy number, trapezoidal fuzzy number, and normal fuzzy number. In this study, the triangular fuzzy linguistic numbers of a Likert five-point fuzzy linguistic scale were used to indicate the weights of the indexes. Based on the viewpoint of fuzzy linguistic, the fuzzy linguistic scale was designed, and an approach of fuzzy linguistic evaluation was employed to measure the feelings of the participants.

A fuzzy linguistic approach was applied to the questionnaire survey in this study to conduct multiple linear regression for forecasting the fuzzy linguistic of consumers' satisfaction by means of the factor of furniture product knowledge. Wu, Hsiao, and Kuo (2004) proposed the data processing of a fuzzy rule database; respectively giving the linguistic variables of the satisfaction of pre-test expectation five linguistic phrases, namely "strongly agree," "more agree," "agree," "disagree," and "strongly disagree," to respectively represent a triangular fuzzy linguistic number. It was assumed that a, b, and c represented the numbers of the expected triangular fuzzy linguistic coordinates, so F = (0, 0,1), (0, 1, 2), (1, 2, 3), (2, 3, 4), and (3, 4, 5), which respectively represented the five linguistic phrases. The data were outputted after fuzzy inference and defuzzification (Klir & Yuan, 1995). That is, the fuzzy statistics obtained by fuzzifying the satisfaction were defuzzified in order to obtain specific values for the following research and analyses. The center-of-area approach used by Kaufmann and Gupta (1991), Chien and Tsai (2000), and Hsu and Lin (2005) was applied to the defuzzification. The triangular fuzzy linguistic numbers were and found as follows (Figure 2.)

The de-satisfaction linguistic fuzzification formula, namely $\tilde{F}$, is listed as follows: Assume $\tilde{F} = (a, b, c\ )$, $V_{\tilde{X}}$ is the coordinate mean of triangular fuzzy linguistic, $V_{\tilde{X}} = (a + 2b + c)/4$, $u(x)$ is the fuzzy membership function, and the value of $u(x)$ is 0~1. a_1 b_1 c_1 ----- $\tilde{F} = (a_1, b_1, c_1)$

→ the fuzzy linguistic calculation of the second part of the questionnaire

     a_2 b_2 c_2 ---- $\tilde{F} = (a_2, b_2, c_2)$ →

the fuzzy linguistic calculation of the third part of the questionnaire

Equation (1) was induced from the fuzzy linguistic descriptive statistic equation of the second part of the questionnaire:

$\tilde{F} = (a_1, b_1, c_1)$, and $V_{\tilde{X}} = (a_1 + 2b_1 + c_1)/4$

can be converted into

Fuzzy Lingustic Mean $= \left[\sum_{1}^{n} (a_1 + 2b_1 + c_1)\ \right]/4N$

$,N=702(participants)$ ----(1)

Equation (2) was induced from the fuzzy linguistic descriptive statistic equation of the third part of the questionnaire:

$$: \widetilde{F} = \left(a_2, b_2, c_2\right);$$
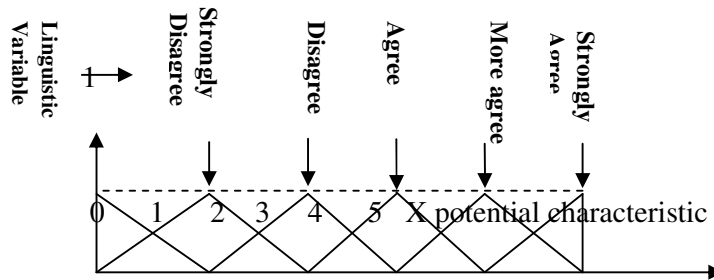
Figure 2. the membership function diagram of five-level fuzzy linguistic variables

$V_{\widetilde{X}} = (a_2 + 2b_2 + c_2)/4$ can be converted into

$$\text{Fuzzy Lingustic Mean} = \left[\ \sum_{1}^{n}(a_2 + 2b_2 + c_2)\ \right]/4N$$

,N702(participants) ----(2)

The fuzzy linguistic values of the questionnaire were analyzed by means of Equations (1) and (2).

The Reliability and Validity of the Questionnaire

The validity of this questionnaire was confirmed through the interview of expert panel. Moreover, sixty-nine copies of the questionnaire were applied to the pilot study, and then, the questionnaire was appropriately amended and adjusted. According to the standard suggested by Nunnally (1995), the content of a ques-tionnaire will be reliable when the Cronbach's α is higher than 0.7. The second part of this questionnaire was the opinions of the participants about furniture product knowledge, including subjective knowledge, objective knowledge, and experience knowledge. The Cronbach's α obtained from the pilot study was 0.926, which was higher than 0.7. The third part of the questionnaire was the satisfactory evaluations of the participants after buying and using furniture products. The Cronbach's α obtained from the pilot study was 0.937, which was higher than 0.7. The two parts of the questionnaire were both highly reliable in the pilot study.

The Descriptive Statistic Result of the Questionnaire

In terms of sample structure, 702 participants came from various areas in Taiwan. The male participants accounted for 48.3% while the female participants accounted for 51.7%. For age, "20-29 years old" accounted for 34.6%, which was the maximum, and "60 years old and the above" accounted for 8.1%, which was the minimum. In terms of education, "college" accounted for 39.7%, which was the maximum, whereas "junior high school and the below" accounted for 17.1%, which was the minimum. For income, "USD5,00-1,000" accounted for 36%, which was the maximum whereas "USD 3,000 and the above" accounted for 5.6%, which was the minimum.

The Fuzzy Linguistic Descriptive Statistic Analysis of the Questionnaire

Based on the second and third parts of the questionnaire of the subjective knowledge, objective knowledge, and experience knowledge of furniture product knowledge on the fuzzy linguistic of consumers' satisfaction (Table 1.), the consumers attached the most importance to experience knowledge in furniture product knowledge, and the fuzzy linguistic mean was 4.1197. They attached less importance to objective knowledge in furniture product knowledge, and the fuzzy linguistic mean was 3.7236.

Table 1. The fuzzy linguistic descriptive statistics of the questionnaire of furniture product knowledge

	N	Minimum	Maximum	Mean	Std. Deviation
Subjective knowledge	702	2.00	5.00	3.7350	.65931
Objective knowledge	702	2.00	5.00	3.7236	.69066
Experience knowledge	702	2.00	5.00	4.1197	.68814
Furniture product knowledge	702	3.00	5.00	3.8704	.54105
Valid N (listwise)	702				

The fuzzy linguistic means of furniture product knowledge on consumers' satisfaction were all higher than the fuzzy linguistic means of subjective knowledge and objective knowledge. The fuzzy linguistic mean was 3.87, as shown in Table 1 and Figure 3. The expression of the fuzzy membership function was $u(x):1=$ (3.87-3.0):(4-3), and the obtained fuzzy membership function was $u(x)=0.87$. It was found that the fuzzy value of the questionnaire was between 3 and 4, namely between "more agree" and "agree," indicating that the consumers were considerably satisfied with furniture product knowledge.

$u(x)$

1

0.87
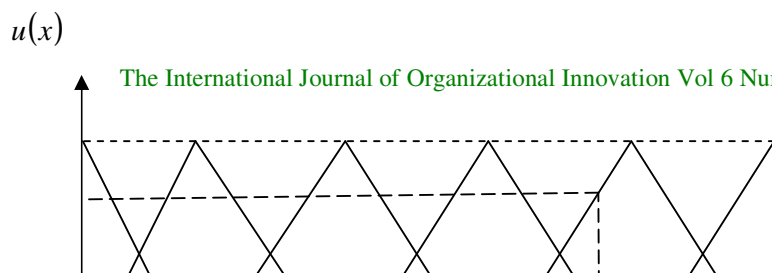
0   1   2   3   3.87 4   5   X potential features

Figure 3: the membership diagram of the linguistic variables of satisfaction

Table 2. The Pearson correlation analysis of the fuzzy linguistics of subjective knowledge, objective knowledge, experience knowledge in furniture product knowledge and consumers' satisfaction

Factors		Subjective knowledge	Objective knowledge	Experience knowledge	Consumer's Satisfaction
Subjective knowledge	Pearson Correlation	1	.290(**)	.447(**)	.244(**)
	Sig. (2-tailed)	.	.000	.000	.000
	N	702	702	702	702
Objective knowledge	Pearson Correlation	.290(**)	1	.124(**)	.387(**)
	Sig. (2-tailed)	.000	.	.001	.000
	N	702	702	702	702
Experience knowledge	Pearson Correlation	.447(**)	.124(**)	1	.407(**)
	Sig. (2-tailed)	.000	.001	.	.000
	N	702	702	702	702
Consumer's Satisfaction	Pearson Correlation	.244(**)	.387(**)	.407(**)	1
	Sig. (2-tailed)	.000	.000	.000	.
	N	702	702	702	702

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

The Pearson Correlation Analysis of the Fuzzy Linguistics of Furniture Product Knowledge and Consumers' Satisfaction

The fuzzy linguistics of objective knowledge and experience knowledge in furniture product knowledge were the least

correlated; r(702)= .124, p<.00. In addition, the fuzzy linguistics of consumers' satisfaction and subjective knowledge, objective knowledge, and experience knowledge in furniture product knowledge were all significantly correlated. Among them, the mean and the satisfaction correlation of ex-

perience knowledge were the highest; $r(702)= .407$, $p<.00$.

The Multiple Linear Regression Analysis of the Fuzzy Linguistics of Furniture Product Knowledge and Consumers' Satisfaction

The multiple linear regression approach was employed to establish a mathematical functional relationship between the fuzzy linguistics of furniture product knowledge and consumers' satisfaction, and the functional relationship was then used as a dependent variable to forecast satisfaction. The independent variables were (ki_1, ki_2, ki_3) furniture product knowledge (subjective knowledge, objective knowledge, and experience knowledge), and the fuzzy linguistic (Si) of consumers' satisfaction was regarded as the dependent variable to forecast the fuzzy linguistic of consumers' satisfaction as time changed. The obtained equation of multiple linear regression is listed as follows:

$$Si = x + q_1 ki_1 + q_2 ki_2 + q_3 ki_3$$

in which, Si = the fuzzy linguistic forecast of consumers' satisfaction; x = additive constant; ki_1 (subjective knowledge), ki_2 (objective knowledge), and ki_3 (experience knowledge) = predictors; q_1, q_2, and q_3 = linear slopes.

The multiple linear regression equation was used as the forecast equation of consumers' satisfaction in order to transform into Predicted Consumer Satisfaction value

$= x + q_1*$subjective knowledge $+ q_2*$objective knowledge $+ q_3*$ experience knowledge.

The multiple linear regression equation was employed in this study as the relational equation for forecasting the influence of furniture product knowledge on the fuzzy linguistic of consumers' satisfaction. According to Tables 3, 4, and 5, there were three predictors in this multiple linear regression, respectively subjective knowledge, objective knowledge, experience knowledge, which were significantly correlated with the fuzzy linguistic of consumers' satisfaction. $R^2 =.530$, adjusted$R^2 =.278$, $F(3,701)= 91.109$, and $p=.000$. Through the multiple linear regression analysis, furniture product knowledge was used to forecast the fuzzy linguistic of consumers' satisfaction. The obtained multiple linear regression equation was Predicted Consumer Satisfaction value $=1.704-.020$ subjective knowledge $+.266$ objective knowledge $+ .287$ experience knowledge.

Conclusions and Suggestions

It was found in this study that the consumers attached the most importance to experience knowledge and paid less attention to objective knowledge in terms

Table 3. The model summary of multiple linear regression analysis

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.530(a)	.281	.278	.44791

a. Predictors: (Constant), Experience knowledge, Objective knowledge, Subjective knowledge

Table 4. The ANOVA of multiple linear regression analysis

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	54.836	3	18.279	91.109	.000(a)
	Residual	140.036	698	.201		
	Total	194.872	701			

a Predictors: (Constant), Experience knowledge, Objective knowledge, Subjective knowledge
b Dependent Variable: Consumer's Satisfaction

Table 5. The coefficients of multiple linear regression analysis

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.704	.135		12.637	.000
	Subjective knowledge	-.020	.030	-.025	-.667	.505
	Objective knowledge	.266	.026	.348	10.382	.000
	Experience knowledge	.287	.027	.375	10.454	.000

a Dependent Variable: Consumer's Satisfaction

of furniture product knowledge. The fuzzy linguistics of subjective knowledge and experience knowledge were the most correlated, and they were significantly correlated with each other. The fuzzy linguistics of objective knowledge and experience knowledge were the least correlated. Furthermore, consumers' satisfaction was significantly correlated with the fuzzy linguistics of subjective knowledge, objective knowledge, and experience knowledge. (2) the fuzzy linguistic mean of furniture product knowledge on con

sumers' satisfaction was higher than the fuzzy linguistic means of subjective knowledge and objective knowledge. The result showed that the fuzzy linguistic of consumers for experience knowledge in furniture product knowledge was the highest. (3) In this study, multiple linear regression was used to forecast the influence of furniture product knowledge on the fuzzy linguistic of consumers' satisfaction. There were three forecast independent variables, respectively subjective knowledge, objective knowledge, and

experience knowledge, which were significantly correlated to the fuzzy linguistic of consumers' satisfaction. The obtained multiple linear regression was significantly established. Subjective knowledge, objective knowledge, and experience knowledge in furniture product knowledge can be used to forecast the correlation of the fuzzy linguistic of consumers' satisfaction.

The conclusion of this study can be used by designers as a reference to furniture product design and development, and factors, such as subjective knowledge, objective knowledge, and experience knowledge, which were accepted by all consumers should be included the design consideration of furniture products in hopes of designing the products which meet the demand of consumers, can increase consumers' satisfaction, and further increase the development performance and profits of enterprises.

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DESIGN AND IMPLEMENTATION OF SAFETY LEARNING SYSTEM TO CRAM SCHOOL

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Abstract

This study aims to develop safety learning system, and let the system become intelligent. We adopt the swarm intelligence and active Ultra-High Frequency RFID for safety learning system, and develop friendly human-computer-interface software for users use the personal digital assistants, personal computers or notebooks. We program the system and software with Extensible Markup Language (XML) and C sharp language. If the users begin to search, the kernel safety learning system automatically communicates with other RFID readers by agents, and the agents can search the closer camera for users. This study's result will be implemented to the cram school, and it would be helpful for the paterfamilias to hold all situations about their children at the cram school.

Keywords: Swarm Intelligence; Ultra-High Frequency RFID; Human-Computer-Interface

Introduction

Xu et. Al., (2013) states that Radio-frequency identification (RFID) technology is one of the encouraging technologies to improve the productivity in warehouse management. Technological developments in content-based analysis of

digital video information are undergoing much progress, with ideas for fully automatic systems now being proposed and demonstrated (Hyowon, Alan, Noel, & Barry, 2006). Effective agent teamwork requires information exchange to be conducted in a proactive, selective, and intelligent way (Fan, Wang, Sun, & Yen, 2006). Self- managing systems (i.e. those that self-configure, self-protect, self-heal and self-optimize) are the solution to tackle the high complexity inherent to these networks (Barco, Lázaro, Díez, & Wille, 2008).

Digital representations are widely used for audiovisual content, enabling the creation of large online repositories of video, allowing access such as video on demand (Justin & Timothy, 2006). Digital artifacts created via transformational technologies often embody implicit knowledge that must be correctly interpreted to successfully act upon the artifacts (Leonardi & Bailey, 2008). With continued advances in communication network technology and sensing technology, there is astounding growth in the amount of data produced and made available through cyberspace (Chen & Liu, 2006). Felfernig et al., (2009) focus on the first aspect and present an approach which supports knowledge engineers in the identification of faults in user interface descriptions.

Chen (2009) adopts the Windows Media Player along the RTP/RTSP protocol in order to embed the mobile informa-

tion system into the users' machines (personal digital assistants or smart phones), and provides a solution (including hardware solutions) to promote campus safety management. He also combines the swarm intelligence and Web Services to transform a conventional library system into an intelligent library system having high integrity, usability, correctness, and reliability software for readers (Chen, 2008). L. S. Chen, and S. L. Chen (2007) built the intelligent system and developed a knowledge base of the computer-parts.

Jannach, Leopold, Timmerer, and Hellwagner (2006) present a novel, fully knowledge-based approach for building such multimedia adaptation services, addressing the above mentioned issues of openness, extensibility, and concordance with existing and upcoming standards. Fazzinga, B., Flesca, S., Furfaro, F., and Masciari, E. (2013) aim at constructing a lossy synopsis of the data over which aggregate queries can be estimated, without accessing the original data.

This study adopts the swarm intelligence and active Ultra-High Frequency RFID for safety learning system, and develop friendly human computer interface software for users use the personal digital assistants (PDAs). We program the system and software with Extensible Markup Language (XML) and C sharp language. If the users begin to search, the kernel safety learning system automatically communicates with other RFID readers

by agents, and the agents can search the closer camera for users.

Related Work

For Mobile Communication

Malek and Frank (2006) have focused on determining a near-optimal collision-free path because of its importance in robot motion planning, intelligent transportation systems, and any autonomous mobile navigation system. A spanning tree is based on the autoconfiguration of mobile ad hoc networks and a novel approach for efficient distributed address autoconfiguration (Li, Cai, & Xu, 2007). Pavlou, Huigang, and Yajiong (2007) build upon the principal–agent perspective to propose a set of four uncertainty mitigating factors - trust, Web site informativeness, product diagnosticity, and social presence. A neural network is trained to learn the correlations and relationships that exist in a data-set (Kaikhah and Doddament, 2006). Gao and Zhang (2008) have proposed an effective technique to determine the number and distribution of equilibria and a new supervised linear feature extraction technique for multiclass classification problems particularly suited to the nearest-neighbor classifier technique (Masip and Vitria, 2008).

Wang and Chen (2008) present a new method for evaluating students' answer scripts using vague values, where the evaluating marks awarded to the questions in the students' answer scripts are represented by vague values. Payne (2008) examines the Web service paradigm from an open multi-agent system perspective and contrasts the formally grounded knowledge-centric view of agents with a pragmatic declarative bottom-up approach adopted by Web services. The location-based spatial queries having certain unique characteristics can be revealed, which traditional spatial query processing systems employed in centralized databases do not address（Ku, Zimmermann, & Wang , 2008). Lee and Wang (2009) present an ontology-based computational intelligent multi-agent system for Capability Maturity Model Integration (CMMI) assessment.

Medium access control protocols have quality of service support topology independent link activation transmission scheduling - for mobile code-division multiple-access ad hoc networks (Su, Su, & Li, 2008). The context-aware query processing system enhances the semantic content of Web queries using two complementary knowledge sources: lexicons and ontologies (Storey, Jones, Sugumaran, & Purao, 2008). Yap, Tan, and Pang (2008) propose the Explaining BN Inferences (EBI) procedure for explaining how variables interact to reach conclusions.

For RFID Systems

Implementation of RFID systems in healthcare resulted in enhanced automa-

tional, informational and transformational effects that helped to eliminate paper-based processes, manual processes and low visibility of patients, staff, equipments and data, etc (Anand, A., and Wamba, S. F., 2013)..Broekmeulen, and Donselaar (2009) suggest a replenishment policy for perishable products which takes into account the age of inventories and which requires only very simple calculations. Zhou (2009) takes a different perspective by modeling item-level information visibility in general. Delgado, Ros, and Vila (2009) present a system that is able to process the information provided by a Tagged World to identify user's behavior and to produce alarms in dangerous situations. Abad et al., (2009) present important advantages regarding conventional traceability tools and currently used temperature data loggers such as more memory, reusability, no human participation, no tag visibility needed for reading, possibility of reading many tags at the same time and more resistance to humidity and environmental conditions.

Lee, and Chan (2009) propose a genetic algorithm to determine such locations in order to maximize the coverage of customers. Also, the use of RFID is suggested to count the quantities of collected items in collection points and send the signal to the central return center. Angeles (2009) looks at the perceived ability of components of IT infrastructure integration and supply chain process integration to predict specific radio frequency identification (RFID)

system deployment outcomes exploration, exploitation, operational efficiency, and market knowledge creation.

For Swarm Intelligence

Tabu search and ant colony perform better for large-sized problems, whereas simulated annealing is optimal for small-sized problems and it is therefore essential that a maintenance scheduling optimizer can incorporate the options of shortening the maintenance duration and/or deferring maintenance tasks in the search for practical maintenance schedules. Allahverdi and Al-Anzi (2008) addressed a two-stage assembly flow-shop scheduling problem with a weighted sum of make span and mean completion time criteria, known as bi-criteria. The learners and lecturers agree that style-based ant colony systems can provide useful supplementary learning paths (2008). Ant colony intelligence (ACI) is proposed to be combined with local agent coordination in order to make autonomous agents adapt to changing circumstances, thereby yielding efficient global performance. This indicates that the ACO algorithm is an optional compromise strategy between preferable phase unwrapping precision and time- consuming computations

Methodology and Research Design

This study adopts the active Ultra-High Frequency RFID and swarm intelligence for safety learning system, and de-

velop friendly human computer interface software for users use the personal computers or notebooks. The system is developed in the environment of: Microsoft Windows Server 2008, Internet Information Services 7.0 (IIS 7.0), Microsoft Structured Query Language (MS SQL) Server 2008, and Visual Studio 2008 (VS 2008). The programming languages are Extensible Markup Language (XML) and C#.

RFID System

Figure 1. shows the framework of RFID system. Figure 2. shows the searching process.

Searching Design

The searching path of this study is from (Agents Generator) to (Reader)$_i$ and the distance of (Agents Generator) to
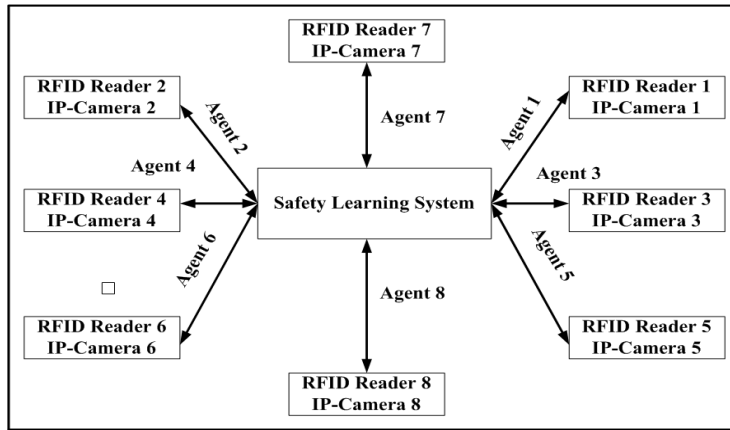
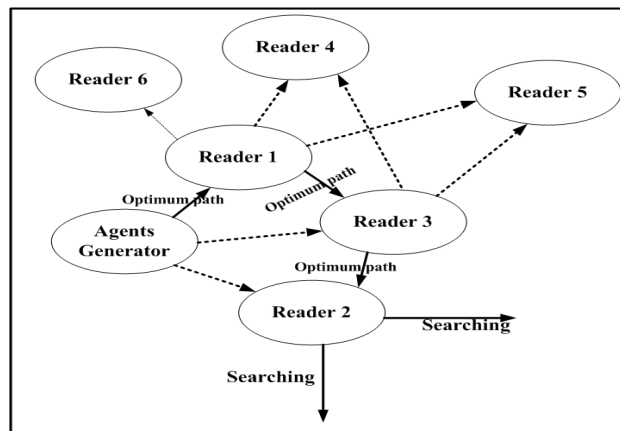

Figure 1. Framework of RFID system

Figure 2. Searching process

(Reader)$_i$ is the closest, as shown in Figure 2. The searching path begins at (Agents Generator), and it has two choice. One is (Reader)$_1$, and the other is (Reader)$_2$. Because the distance of (Agents Generator) to (Reader)$_1$ is shorter than (Agents Generator) to (Reader)$_2$, the optimum searching path is (Agents Generator) to (Reader)$_1$. and so forth, the optimum searching path is " (Agents Generator) $\rightarrow$ (Reader)$_1 \rightarrow$ (Reader)$_3 \rightarrow$ (Reader)$_2 \rightarrow \ldots$"

Figure 2 shows the searching process. This study amends the ant algorithm of Birattari et al. 【2007】. It can let the safety system become intelligent and mobility. The design of the "Agents Generator" is very important, and it is the kernel technology in this study. The developing process is described as below. (Note: the agents are seemed as the ants.)

Meaning of the Symbols and Nouns

(a) n: the numbers of RFID readers

(b) m= $\Sigma_{k= 1 to n}$ b$_i$ (t): The total agents ; b$_i$ (t): The numbers of agents in the (Agents Generator)

(c) d$_{ij}$: the distant of (Agents Generator) to (Reader) $_i$; This study considers that it is symmetrical; therefore, d$_{ij}$ is equal to d$_{ji}$

(d) τ_{ij} (t): the intensity of pheromone upper edge
τ_{ij} (t) = $\rho \tau_{ij}$ (t) + $\Delta \tau_{ij}$ (Eq.1).

This study uses (Eq.1） to update the pheromone.

ρ: The parameters of pheromone evaporation

(e) $\Delta \tau_{ij} = \Sigma_{k=1}^{m} \Delta \tau_{ij}^{k}$ (Eq. 2)

$\Delta \tau_{ij}^{k}$: The kth agent remains pheromone going through the edge (i, j). It fined as equation.3.

Q: The influential parameter of the pheromone

L$_K$: the total length of the route, and the kth agent goes all over the (Readers)

$\Delta \tau_{ij}^{k}$ = Q / L$_K$, the Kth agent goes through edge (i, j) between time point t and

(t + t$_i$) $\Delta \tau_{ij}^{k}$= 0, Otherwise (Eq.3)

(f) R: The cycles counter agent goes through all of the readers, and the R$_{max}$ is the upper limit of R

(g) Tabu$_k$ (I) ：The record of the kth has gone through the re, anaders the "I "is to make a visit to "Ith"reader. It can prevent the agent from going back to cities already visited.

(h) μ_{ij} ：The inverse of the distance of (Agents Generator) to (Reader)$_i$

μ_{ij} = 1 / d$_{ij}$ (Eq. 4)

(i) P$_{ij}^{k}$ (t) ：The probability that kth agent goes from (Agents Generator) to (Reader)$_i$

Set $\Phi = k \in (n - Tabu_{k (} I))$

P$_{ij}^{k}$ (t) = 【τ_{ij} (t)】$^{\alpha}$ 【μ_{ij}】$^{\beta}$ / Σ_{Φ} 【τ_{ik} (t)】$^{\alpha}$ 【μ_{ik}】$^{\beta}$, if j (n $-$ Tabu$_{k (}$ t)) (Eq. 5)

Or P$_{ij}^{k}$ (t) = 0 (Eq. 6)

The α and β are the important controlled parameters of pheromone information and μ_{ij}.

Designing Steps

The designing steps are described below.

Step 1：Set t=0、R= 0（"t" is the time counter, and "R" is the cycles counter）. For all edge (i , j) , Set $\tau_{ij}(t)$ = Constant, $\Delta\tau_{ij}(t)$ = 0 . To put m agents into n readers

Step 2：Set I=1（"I" is Tabu list index）. For k = 1 to m（The record of the kth agent is listed in $Tabu_k$ (I) at agents generator.）

Step 3：Set I= I +1. For k = 1 to m（Using equation 5 to decide $(Reader)_i$ and moving the kth agent to $(Reader)_i$ recorded in $Tabu_k$ (I).）

Step 4：For k = 1 to m do .To move the kth agent from $Tabu_k$ (n) to $Tabu_k$ (1) and calculate the total length of all paths recorded, and update the shortest path. To cal-culate each edge (i , j). For k = 1 to m do. $\Delta\tau_{i\,j}$ =$\Delta\tau_{ij}$ + $\Delta\tau_{ij}^{k}$

Step 5：By $\tau_{i\,j}$ (t + t$_1$) = $\rho\tau_{i\,j}$ (t) + $\Delta\tau_{i\,j}$, Calculates $\tau_{i\,j}$ (t + t$_1$) for each edge (i , j). Set t = t + t$_1$, R = R + 1 for each edge (i , j). Set $\Delta\tau_{ij}$ = 0 for each edge (i , j)

Step 6：If (R < R$_{max}$) and（No en-tering in stop situation）Then clear the entire Tabu list . Go To Step 2. Else print the shortest path and stop

Results

The safety learning system has been successfully developed, as shown in Figure 3-7.

Figure 3. Welcome Frame

Figure 4. Class 1

Figure 5. Class 1

Figure 6. Office

Figure 7. Class 4

Conclusion

This study aims to integrate safety learning system, and let the system become intelligent. This study used artificial intelligence and active Ultra-High Frequency RFID directly to guide paterfamilias monitoring their children's in-time images. Thus, it could save the paterfamilias' time on operating the instrument. Even someone who has not the professional knowledge about information technology could use them skillfully.

This study also develops friendly human-computer-interface software for users use the personal computers or notebooks. The size of the software is 22 kilobits; therefore, the software is not a liability for the users' tools. If the users begin to search, the kernel safety learning system automatically communicates with other RFID readers by agents, and the

agents can search the closer camera for users. This study has successfully implemented to the cram school, and it would be helpful for the paterfamilias to hold all situations about their children at the cram school. Paterfamilias can understand their children's learning through PDA simultaneously. The cram school staff also can understand the classrooms' situation through the system; and they do not need to make their round to classroom personally. That will be great help in the grip of whole after-school remedial education, teaching and learning situation.

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POWER WINNER-TAKE-ALL NEURAL NETWORKS

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Abstract

The famous fast winner-take-all (WTA) neural network, for example: MAXNET, IMAX-NET, and GEMNET there are the same shortcoming of these WTA neural networks. That is when there are a lot of competitors that their speed of convergence will be slow. For overcome this shortcoming, in this paper, we propose square neural network (SQNET) and power neural network (PONET). We use square and power methods and mean concept of GEMNET to build SQNET and PONET, and compute weights of SQNET and PONET. In simulation, we find the average iterations of MAXNET, IMAXNET, GEMNET, SQNET and PONET in uniform distribution, normal distribution, and peak uniform distribution. Then we exploit regression method to predict that the convergent limit of PONET. With the result of simulation and predict, we find that when there are a lot of competitions, there is faster speed of convergence of SQNET and PONET than MAXNET, IMAXNET, and GEMNET. Moreover, there is not over inhibition problem of SQNET and PONET. We find the speed of convergence of PONET will approximate to 1. SQNET and PONET indeed improve the speed of convergence of WTA neural networks.

Keywords: winner-take-all, square neural network (SQNET), power neural network (PONET), speed of convergence, over inhibition

Introduction

Neural network is a kind of information processing technology based on research of brain and nervous system. That has been used in many fields of research, for example: cognitive science, neurobiology, computer engineering/science, signal processing, optics and physics. In order to develop the neural processing models, the training networks play an important role for updating the connection weights in neural networks.

This paper discusses a large variety of competitive learning networks, whose synaptic weights are adapted according to unsupervised learning rules. In many well-known neural networks [1, 4, 10, 24, 28-29, 30, 32-34], in the winner-take-all (WTA) process, the neuron which is initially most activated will gradually dominate and become maximally activated while the other competitive neurons die out. These WTA neural networks [2-3, 5-9, 11-23, 25-27, 31, 35] for selecting the largest element from a data set are key elements in competitive learning. The MAXNET [27] which adopts heavy lateral inhibition is a famous WTA neural net work. The IMAXNET [15] which changes a static state to dynamic based on MAXNET. Recently, the general mean-based neural network (GEMNET) with dynamically mutual inhibition has been developed based on the concept of the statistical mean to achieve fast convergence.

A very important point in WTA neural network is speed of convergence. But MAXNET, IMAXNET and GEMNET, There are the same shortcoming of these WTA neural networks. That is when there are a lot of competitors that their speed of convergence will be slow. For overcome this shortcoming, we use square and mean concept of GEMNET to build square neural network (SQNET). That is a one-layer WTA neural network. Then we exploit power of mathematics to build power neural network (PONET) based on concept of SQNET. We suppose the speed of convergence of PONET will faster and faster when its power increases progressively. So there are three purposes of this paper. First, build a faster WTA neural network. Second, prove there are better convergent performance of SQNET and PONET. Third, predict the convergent limit of PONET then we will review three well-known WTA neural networks.

MAXNET

The MAXNET [27] is a one-layer competitive architecture which gets the winner that is the one with the maximum node value. If M competitive neurons with initial activations X_1, X_2, …, and X_M are arranged in ascending order as $X_{<1>} \leqq .. \leqq X_{<M-1>} \leqq X_{<M>}$, Then $X_{<M>}$ is called the mth least activation, where <m> carries the original index of the neuron. Thus, the first and second maximum activations can be expressed as $X_{<M>}$ and

$X_{<M-1>}$, respectively. The MAXNET shown in Figure 1 is a one-layer neural network with a feedback structure whose design mimics heavy use lateral inhibition of the human brain. In the MAXNET, the connection weights between node i and node j are given by

$$W_{ij} = \begin{cases} 1 & i = j \\ -\varepsilon & i \neq j, \varepsilon = 1/M, and\ 1 \leq i, j \leq M \end{cases}$$

(1)
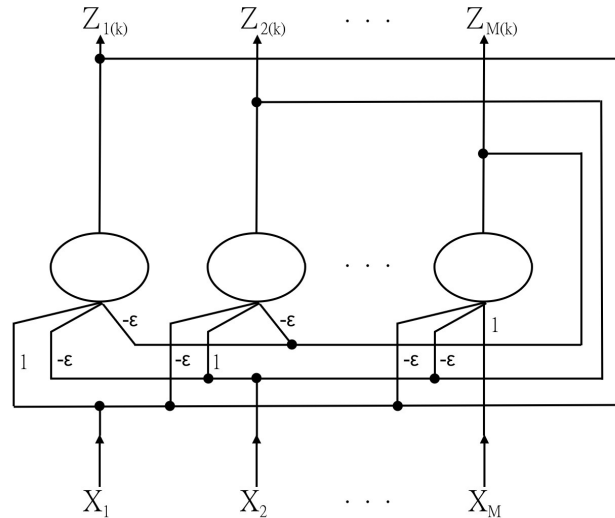
Figure 1. The configuration of the MAXNET

The MAXNET [27] is first initialized by X_1, X_2 … X_M, then iterates until only one node is positive. It can be proven that the MAXNET will converge when ε is less than 1/M. The most important advantage of the MAXNET is its simple one-layer structure. But its slow convergent speed, which largely depends on the distribution of activations and the number of competitors, is the main shortcoming of the MAXNET.

IMAXNET

The IMAXNET [15] shown in Figure 2 is also a one-layer neural network. Its idea is from the MAXNET. When the output size of the MAXNET decreases, its weightεis not change. It turns out the convergent speed will be slow. The IMAXNET changes the weight ε after each inhibition. Therefore the IMAXNET will decrease quicker than the MAXNET. In the other words, the convergent speed of the IMAXNET is quicker than the MAXNET. The connection weights of the IMAXNET between node i and node j are given by

$$W_{ij}(k) = \begin{cases} 1 & if\ i = j \\ \varepsilon(k) = -1/M(k) & if\ i \neq j \end{cases}\ 1 \leq i, j \leq M$$

(2)

Where M(k) denotes the number of active neurons in the MAXNET.
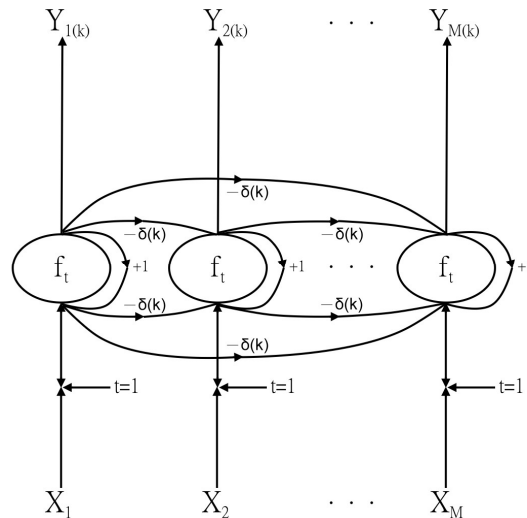
Figure 2. The configuration of the IMAXNET

The main disadvantage both of the MAXNET and the IMAXNET is that when the number of competitors is very large, the convergent speed of the IMAXNET will be slow.

GEMNET

The GEMNET [19] has the same one-layer competitive neural network based on the concept that the maximum is always greater than the mean of activations. Thus, the connection weights between node i and node j in GEMNET, depicted in Figure 3 are expressed as

$$W_{ij}(k) = \begin{cases} 1 & i = j \\ -\dfrac{1}{M(k)-1} & i \neq j \end{cases} \quad 1 \leq i, j \leq M$$

(3)

Where M(k) denotes the number of active neurons in the GEMNET.

The GEMNET with built-in dynamic threshold outperforms MAXNET, which only uses fixed mutual inhibition. It is also obvious that the speed of convergence is slow in GEMNET when there are many competitors. Thus, we will propose a fast WTA neural network to conquer a very large number of competitors.
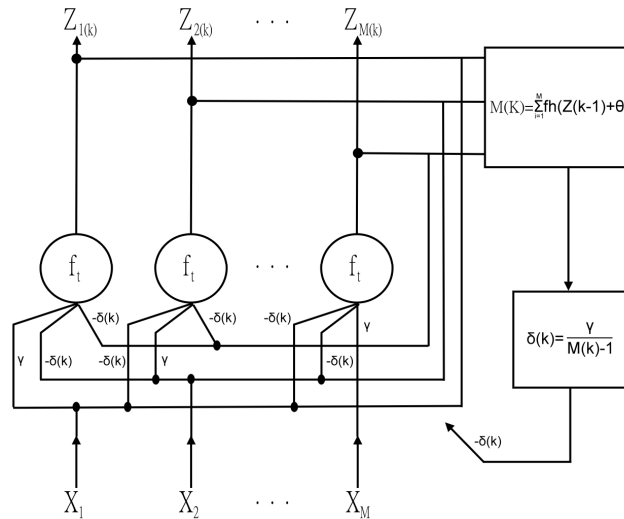
Figure 3. The configuration of the GEMNET

SQNET and PONET

In this section, we first introduce the basic idea of SQNET and PONET. Then calculate the weights of SQNET and PONET. At last, we have used the mathematical induction to prove the convergent speed of PONET will be faster and faster while its power value increases progressively.

The Idea of SQNET and PONET

First, we propose the SQNET that employ the square method of the mathematics and the mean concept of the GEMNET to expand the difference between neuron and the others to reach faster convergent speed. The purpose of square is for increase the value of neuron and expands the difference between neuron and the others. But we must solve two problems at first. Problem 1: the value of neurons lie between 0 and 1 will be smaller after square. Problem 2: When the positive neuron and the negative neuron exist at the same time, the negative neuron will turn into the positive neuron after square. For problem 1, we add 1 for all neurons before square. For problem 2, we do preprocess which compare neuron with 0. That is the negative neuron while less than 0 then rid of these and leaves positive.

We do preprocess for X_1, X_2 … X_M with nonlinear function in the SQNET shown in Figure 4. We use square function, expressed as equation (4), in this preprocess.

$$f_S \left(W_i X_i + \theta \right) = \left(W_i X_i + \theta \right)^2 \quad (4)$$
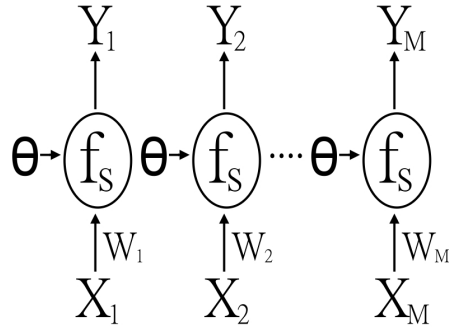
Figure 4. preprocess of SQNET

Before neuron X_i into square function f_S, we give X_i a weight W_i. The neuron X_i becomes W_iX_i. When W_iX_i into f_S, we add a parameter θ. It turns into $W_iX_i+\theta$, then be squared by function f_S, just like $f_S(W_iX_i+\theta)=(W_iX_i+\theta)^2$. After square by function f_S, we get output value, Y_i and complete the preprocess. In the SQNET, We set $W_i=1$ and $\theta=1$. The SQNET combine the mean concept of the GEMNET. Y_1, Y_2 … Y_M compare with the mean after square, less than mean will be inhibition, until finding the maximum activated neuron out.

The PONET extended the concept of the SQNET, replaced the nonlinear function of preprocess by the power function f_P. Its equation expressed as

$$f_P\left(W_iX_i+\theta\right)=\left(W_iX_i+\theta\right)^P \quad (5)$$

The range of W_i and θ are both equal and larger than 1 and the range of P is equal and larger than 2. Because the SQNET and the PONET both employ preprocess to let X_1, X_2 … X_M turned into Y_1, Y_2 … Y_M and combine the mean concept of the GEMNET so there are same configurations in the SQNET and the PONET depicted in Figure 5.
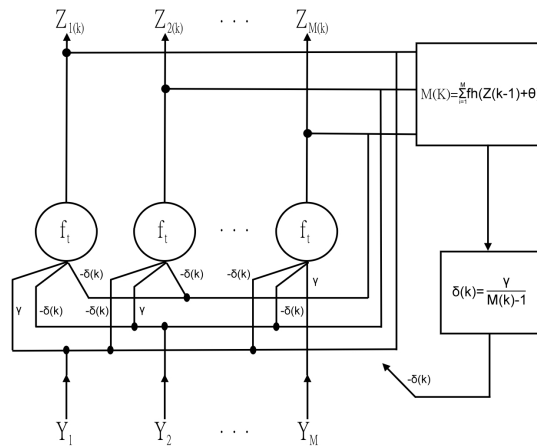
Figure 5. The configuration of the SQNET and PONET

The Weights of SQNET and PONET

The SQNET and the PONET both use the mean concept of the GEMNET and their weights are same. The connection weights between node i and node j are expressed as

$$W_{ij}(k) = \begin{cases} 1 & i = j \\ -\dfrac{1}{M(k)-1} & i \neq j \end{cases} \quad 1 \leq i, j \leq M$$

(6)

Where M(k) denotes the number of active neurons in the SQNET and the PONET.

Take X1 for example, to find the weights of the SQNET and the PONET.

We can get

$$X_1 = Y_1 - \frac{Y_1 + Y_2 + \Lambda + Y_M}{M}$$

after preprocess and combine mean concept. Then take 1/M out, we get

$$X_1 = Y_1 - \frac{1}{M}\left(Y_1 + Y_2 + \Lambda + Y_M\right)$$

Combine the coefficient of X1, we get
$$X_1 = \left(1 - \frac{1}{M}\right)Y_1 - \frac{1}{M}\left(Y_2 + \Lambda + Y_M\right)$$

To find a common denominator for X1, we get
$$X_1 = \left(\frac{M-1}{M}\right)Y_1 - \frac{1}{M}\left(Y_2 + \Lambda + Y_M\right)$$

We want the coefficient of X1 is 1, so multiply M/M-1, we get

$$X_1 = Y_1 - \frac{1}{M-1}\left(Y_2 + \Lambda + Y_M\right)$$

At last, we have found the weights of the SQNET and the PONET. We have got the weight Wij(k) is 1 while i=j and Wij(k)=1/(M(k)-1) while i≠j.

The Convergent Speed of PONET

In this section, we use the mathematical induction to prove that the convergent speed of the PONET will be faster and faster while its power increases progressively. We suppose

M1 represent the maximum activated neuron, M2 represent the second maximum activated neuron and D1 represent the difference between M1 and M2. So we must prove the inequality (7).

$$M_1^P - M_2^P = D_P < M_1^{P+1} - M_2^{P+1} = D_{P+1} \quad (7)$$

Because the power P of PONET more than 2, so we beginning with P=2.

When P=2:

$$M_1^2 - M_2^2 = D_2, \quad M_1^3 - M_2^3 = D_3 \quad \text{then} \quad \frac{D_3}{D_2} = \frac{M_1^3 - M_2^3}{M_1^2 - M_2^2}$$

To factorize $M_1^3 - M_2^3 = (M_1 - M_2)*(M_1^2 + M_1 M_2 + M_2^2)$ and

$$M_1^2 - M_2^2 = (M_1 - M_2)*(M_1 + M_2)$$

So D3/D2 becomes $\dfrac{M_1^3 - M_2^3}{M_1^2 - M_2^2} = \dfrac{(M_1 - M_2)*(M_1^2 + M_1 M_2 + M_2^2)}{(M_1 - M_2)*(M_1 + M_2)}$

To cancel the same factor M1 ─ M2 from the numerator and the denominator, We get

$$\frac{M_1^3 - M_2^3}{M_1^2 - M_2^2} = \frac{(M_1^2 + M_1 M_2 + M_2^2)}{(M_1 + M_2)}$$

M1 and M2 both are positive numbers so the numerator more than the denominator.

We get $\dfrac{D_3}{D_2} = \dfrac{M_1^3 - M_2^3}{M_1^2 - M_2^2} = \dfrac{(M_1^2 + M_1 M_2 + M_2^2)}{(M_1 + M_2)} > 1$ and $D_3 > D_2$

So $M_1^2 - M_2^2 = D_2 < M_1^3 - M_2^3 = D_3$ is existence.

When P=k:

$$M_1^k - M_2^k = D_k, \quad M_1^{k+1} - M_2^{k+1} = D_{k+1} \quad \text{then} \quad \frac{D_{k+1}}{D_k} = \frac{M_1^{k+1} - M_2^{k+1}}{M_1^k - M_2^k}$$

To factorize

$$M_1^{k+1} - M_2^{k+1} = (M_1 - M_2)*(M_1^k + M_1^{k-1} M_2 + M_1^{k-2} M_2^2 + \Lambda + M_1^2 M_2^{k-2} + M_1 M_2^{k-1} + M_2^k)$$

and $M_1^k - M_2^k = (M_1 - M_2) * (M_1^{k-1} + M_1^{k-2}M_2 + M_1^{k-3}M_2^2 + \Lambda + M_1^2 M_2^{k-3} + M_1 M_2^{k-2} + M_2^{k-1})$

So Dk+1/Dk becomes

$$\frac{M_1^{k+1} - M_2^{k+1}}{M_1^k - M_2^k} = \frac{(M_1 - M_2) * (M_1^k + M_1^{k-1}M_2 + M_1^{k-2}M_2^2 + \Lambda + M_1^2 M_2^{k-2} + M_1 M_2^{k-1} + M_2^k)}{(M_1 - M_2) * (M_1^{k-1} + M_1^{k-2}M_2 + M_1^{k-3}M_2^2 + \Lambda + M_1^2 M_2^{k-3} + M_1 M_2^{k-2} + M_2^{k-1})}$$

To cancel the same factor M1 − M2 from the numerator and the denominator, We get

$$\frac{M_1^{k+1} - M_2^{k+1}}{M_1^k - M_2^k} = \frac{(M_1^k + M_1^{k-1}M_2 + M_1^{k-2}M_2^2 + \Lambda + M_1^2 M_2^{k-2} + M_1 M_2^{k-1} + M_2^k)}{(M_1^{k-1} + M_1^{k-2}M_2 + M_1^{k-3}M_2^2 + \Lambda + M_1^2 M_2^{k-3} + M_1 M_2^{k-2} + M_2^{k-1})}$$

M1 and M2 both are positive number so the numerator > the denominator.

We get $\frac{D_{k+1}}{D_k} = \frac{M_1^{k+1} - M_2^{k+1}}{M_1^k - M_2^k} > 1$ and $D_{k+1} > D_k$

So $M_1^k - M_2^k = D_k < M_1^{k+1} - M_2^{k+1} = D_{k+1}$ is existence.

When P=k+1:

$M_1^{k+1} - M_2^{k+1} = D_{k+1}$, $M_1^{k+2} - M_2^{k+2} = D_{k+2}$ then $\frac{D_{k+2}}{D_{k+1}} = \frac{M_1^{k+2} - M_2^{k+2}}{M_1^{k+1} - M_2^{k+1}}$

To factorize

$M_1^{k+2} - M_2^{k+2} = (M_1 - M_2) * (M_1^{k+1} + M_1^k M_2 + M_1^{k-1}M_2^2 + \Lambda + M_1^2 M_2^{k-1} + M_1 M_2^k + M_2^{k+1})$ and

$M_1^{k+1} - M_2^{k+1} = (M_1 - M_2) * (M_1^k + M_1^{k-1}M_2 + M_1^{k-2}M_2^2 + \Lambda + M_1^2 M_2^{k-2} + M_1 M_2^{k-1} + M_2^k)$

So Dk+2/Dk+1 becomes

$$\frac{M_1^{k+2} - M_2^{k+2}}{M_1^{k+1} - M_2^{k+1}} = \frac{(M_1 - M_2) * (M_1^{k+1} + M_1^k M_2 + M_1^{k-1}M_2^2 + \Lambda + M_1^2 M_2^{k-1} + M_1 M_2^k + M_2^{k+1})}{(M_1 - M_2) * (M_1^k + M_1^{k-1}M_2 + M_1^{k-2}M_2^2 + \Lambda + M_1^2 M_2^{k-2} + M_1 M_2^{k-1} + M_2^k)}$$

To cancel the same factor M1 − M2 from the numerator and the denominator

We get $\frac{M_1^{k+2} - M_2^{k+2}}{M_1^{k+1} - M_2^{k+1}} = \frac{(M_1^{k+1} + M_1^k M_2 + M_1^{k-1}M_2^2 + \Lambda + M_1^2 M_2^{k-1} + M_1 M_2^k + M_2^{k+1})}{(M_1^k + M_1^{k-1}M_2 + M_1^{k-2}M_2^2 + \Lambda + M_1^2 M_2^{k-2} + M_1 M_2^{k-1} + M_2^k)}$

Since M1 and M2 both are positive number, so the numerator > the denominator.

We get $\dfrac{D_{k+2}}{D_{k+1}} = \dfrac{M_1^{k+2} - M_2^{k+2}}{M_1^{k+1} - M_2^{k+1}} > 1$ and $D_{k+2} > D_{k+1}$

So $M_1^{k+1} - M_2^{k+1} = D_{k+1} < M_1^{k+2} - M_2^{k+2} = D_{k+2}$ is existence.

When P=2, k and k+1, the inequality (7) is existence. We have proven the convergent speed of the PONET will be faster and faster when its power increases progressively.

Simulation

In this chapter, the inputs with uniform, normal and peak-uniform distributions are randomly generated by Monte Carlo simulations to evaluate the WTA behaviors of the MAXNET, IMAXNET, GEMNET, SQNET and PONET.

Simulation of SQNET

Table 1., Table 2. and Table 3. show average numbers of iterations after 1000 independent runs required by MAXNET, IMAXNET, GEMNET and SQNET to achieve convergence under uniform, normal and peak-uniform distribution, respectively. M represents the number of active neurons.

For three distributions, the convergent speed of the SQNET is faster than the others and the SQNET will accelerate gradually when the numbers of neuron M are more and more. The convergent speed of the SQNET in three distributions its

speed order is peak-uniform > normal > uniform. In peak-uniform, when M between 500 and 5000 the speed of convergence of SQNET is constant 4. It meant the performance of the SQNET is very good while M more than 500.

Simulation of PONET

There are two situations for the PONET. Situation 1 is W_i and θ are unfixed and power P is fixed. Situation 2 is W_i and θ are fixed and P is unfixed. Table 5-7 shows the average number of iterations after 1000 independent runs required for complete convergence by PONET in uniform, normal and peak-uniform distributions with situation 1 respectively. and we set P=2, neurons M=500. P represents power and M represents the number of active neurons.

For three distributions, the speed of convergence of PONET will slower when W_i is fixed and θ is increase; the speed of convergence of PONET will faster when W_i is increase and θ is fixed. So the best value of θ is 1. The best value of W_i is greater than 1 or equal to 1. The speed of convergence of PONET in three distributions with situation 1 its speed order is

Table 1. SQNET and other WTAs under uniform distribution.

WTA NETS with Uniform	MAXNET	IMAXNET	GEMNET	SQNET
M	iterations	iterations	iterations	iterations
10	12.896	4.459	3.165	2.954
100	153.829	7.885	6.418	5.463
500	777.707	10.195	8.744	7.140
1000	1562.7	11.244	9.745	7.878
2000	3076.3	12.154	10.763	8.533
3000	4692.7	12.786	11.341	8.962
4000	6234.6	13.205	11.786	9.232
5000	7837.3	13.497	12.101	9.474

Table 2. SQNET and other WTAs under normal distribution.

WTA NETS with Normal	MAXNET	IMAXNET	GEMNET	SQNET
M	iterations	iterations	iterations	iterations
10	10.210	3.760	2.966	1.824
100	105.269	6.388	5.509	3.555
500	535.297	8.074	7.221	4.450
1000	1004	8.754	7.927	4.765
2000	2041.2	9.621	8.631	5.095
3000	3100.4	9.986	9.063	5.249
4000	4181.3	10.163	9.391	5.379
5000	5163.6	10.445	9.593	5.419

Table 3. SQNET and other WTAs under peak-uniform distribution.

WTA NETS with Peak Uniform	MAXNET	IMAXNET	GEMNET	SQNET
M	iterations	iterations	iterations	iterations
10	3.628	2.233	2.005	1.994
100	17.891	4.000	4.000	3.000
500	46.031	5.006	5.000	4.000
1000	67.220	5.990	5.967	4.000
2000	97.553	6.000	6.000	4.000
3000	121.084	6.513	6.398	4.000
4000	140.877	6.997	6.993	4.000
5000	158.217	7.000	7.000	4.000

Table 5. PONET under uniform distribution while P is fixed

PONET（P=2、M=500）with Uniform					
W_i	$\theta=1$	$\theta=1.5$	$\theta=2$	$\theta=2.5$	$\theta=3$
1	7.140	7.150	7.150	7.152	7.153
1.2	7.017	7.052	7.068	7.077	7.087
1.4	6.953	6.986	7.016	7.031	7.042
1.6	6.912	6.953	6.979	6.995	7.010
1.8	6.888	6.919	6.949	6.950	6.965
2	6.868	6.901	6.923	6.944	6.960

Table 6. PONET under normal distribution while P is fixed

PONET（P=2、M=500）with Normal					
W_i	$\theta=1$	$\theta=1.5$	$\theta=2$	$\theta=2.5$	$\theta=3$
1	4.760	4.838	4.889	4.913	4.939
1.2	4.721	4.788	4.833	4.862	4.895
1.4	4.693	4.746	4.793	4.828	4.849
1.6	4.679	4.718	4.758	4.795	4.821
1.8	4.661	4.698	4.732	4.765	4.797
2	4.653	4.689	4.718	4.743	4.772

Table 7. PONET under peak-uniform distribution while P is fixed

PONET（P=2、M=500）with Peak Uniform					
W_i	$\theta=1$	$\theta=1.5$	$\theta=2$	$\theta=2.5$	$\theta=3$
1	4.000	4.000	4.000	4.000	4.000
1.2	3.558	3.799	3.901	3.947	3.964
1.4	3.021	3.193	3.340	3.454	3.528
1.6	3.000	3.002	3.033	3.107	3.175
1.8	3.000	3.000	3.002	3.002	3.016
2	3.000	3.000	3.000	3.000	3.002

peak-uniform > normal > uniform. Next we will discuss situation 2.We use MAT-LAB software to do simulation but there are some limits in its operation while P is larger and larger. We let neurons divided by 10 after each inhibition just for compute in MATLAB easily. Table 8-10 shows the average number of iterations after 1000 independent runs required for complete convergence by PONET in uniform, normal and peak- uniform distributions with situation 2 respectively.

Table 8. PONET under uniform distribution while P is increase

PONET (Uniform)	P=2 (SQNET)	P=2	P=2.5	P=3	P=3.5	P=4
M	iterations	iterations	iterations	iterations	iterations	iterations
10	2.954	3.048	2.980	2.893	2.799	2.701
100	5.463	6.237	6.129	5.963	5.686	5.011
500	7.140	8.586	8.433	8.261	7.931	6.449
1000	7.878	9.564	9.426	9.229	8.916	7.025
2000	8.533	10.542	10.410	10.231	9.874	7.480
3000	8.962	11.148	11.023	10.824	10.471	7.777
4000	9.232	11.565	11.444	11.251	10.877	7.968
5000	9.474	11.894	11.771	11.580	11.216	8.116

Table 9. PONET under normal distribution while P is increase

PONET (Normal)	P=2 (SQNET)	P=2	P=2.5	P=3	P=3.5	P=4
M	iterations	iterations	iterations	iterations	iterations	iterations
10	1.824	2.559	2.450	2.322	2.218	2.128
100	3.555	4.644	4.644	3.443	3.172	2.983
500	4.760	6.096	4.816	3.957	3.594	3.357
1000	4.929	6.737	5.001	4.126	3.854	3.490
2000	5.095	7.375	5.159	4.282	3.902	3.611
3000	5.249	7.730	5.206	4.357	3.974	3.719
4000	5.379	7.967	5.241	4.401	4.019	3.818
5000	5.419	8.147	5.272	4.430	4.054	3.906

Table 10. PONET under peak-uniform distribution while P is increase

PONET (Peak-U)	P=2 (SQNET)	P=2	P=2.5	P=3	P=3.5	P=4
M	iterations	iterations	iterations	iterations	iterations	iterations
10	1.994	1.996	1.992	1.982	1.958	1.921
100	3.000	3.898	3.452	3.009	3.000	2.958
500	4.000	5.000	4.926	4.054	3.987	3.000
1000	4.000	5.144	5.144	4.999	4.000	3.000
2000	4.000	6.000	5.977	5.019	4.369	3.396
3000	4.000	6.000	6.000	5.706	4.791	3.674
4000	4.000	6.146	6.000	5.999	4.991	3.855
5000	4.000	6.837	6.032	6.000	5.000	3.980

For three distributions, the convergent speed of the PONET will be faster and faster while P is increase. For uniform and normal distribution, the convergent speed of the PONET will be faster and faster, while M is increase but not in peak- uniform. The convergent speed of the PONET in three distributions with situation 2 its speed order is peak-uniform $\doteqdot$ normal > uniform.

The Convergent Limit of PONET

In this section, we use regression to predict the convergent limit of PONET when power P is increase. There are some limits in MATLAB when P is larger and

larger. So we let neurons divided by 2^5=64 after each inhibition just for compute in MATLAB easily. According to the result of simulation, the convergent speed of the PONET is the smallest in uniform distribution but still faster and faster while P is increase. So we regard uniform distribution as representative.

First we simulation the average number of iterations after 1000 independent runs required by the PONET to achieve convergence under uniform distribution when P is between 2 and 7.1 and M is 100, 200 and 300, Shows as Figure 6. X-axis represents power P and y-axis represents average number of iterations.

Figure 6. Average convergent speed of PONET
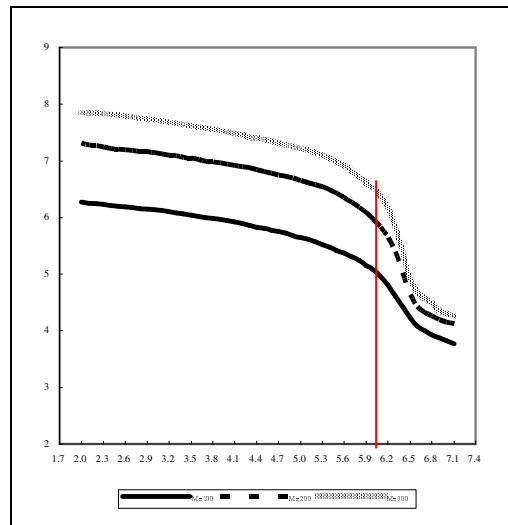
From Figure6, we can find the convergent speed of the PONET will decrease slowly first, then fall quickly, and then decrease slowly. We get inverse curve point is near P=6.5. We do simula-

tion between P=6.5 and 7.1, separate by 0.02, to gain more data and the observations is 31. We do regression with this data set. There is a decrease curve in this data so we use curve estimation of

Table 11. The predict model of the convergent limit of PONET

M	R-square	d.f.	F	P-value	b0	b1
100	0.986	29	2061.76	.000	.1790	8.1188
200	0.924	29	351.75	.000	.3041	7.8272
300	0.972	29	1010.13	.000	.0310	9.9963

nonlinear regression, s-curve, to predict the convergent limit of the PONET and the result of fit shows as table 11. Where M represents the number of active neurons is 100, 200 and 300. significant lever α =0.05. For M=100, 200 and 300, the R-square are all greater than 0.9, and P-value are all smaller than 0. That means using s-curve to predict the convergent limit of PONET is very appropriate. Then we use these three models, show as expression(8), (9) and (10), to predict the convergent limit of PONET with P is between 7.2 and 50, separate by 0.1,

depicted by Figure 7. In Figure 7, x-axis represents power P, y- axis represents average number of iterations after 1000 independent runs required by PONET to achieve convergence under uniform distribution when P is between 2 and 50 and M represents the number of active neurons is 100, 200 and 300.

$$Y = e^{\left(0.179 + \frac{8.1188}{P}\right)} \quad (8)$$

$$Y = e^{\left(0.3041 + \frac{7.8272}{P}\right)} \quad (9)$$

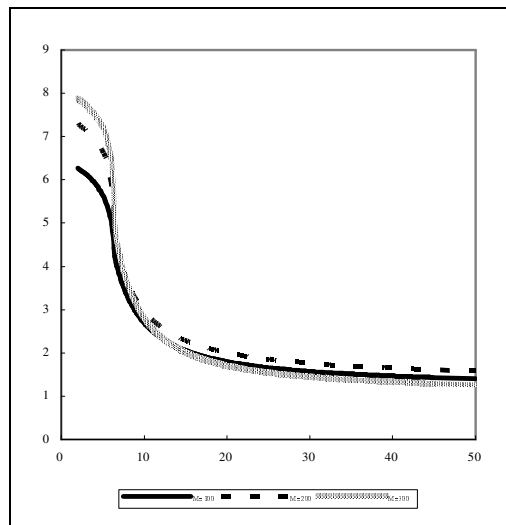$$Y = e^{\left(0.031 + \frac{9.9963}{P}\right)} \quad (10)$$

Figure 7. the convergent limit of PONET

From Figure 7, we find that when power is increase, the average number of iterations will decrease slowly first, then fall quickly and its inverse curve point is 6.5 and then still fall quickly, at last it will be decrease slowly and approximate 1. We also predict that when P is 100000, the average numbers of iterations are 1.196, 1.356 and 1.032 for M=100, 200 and 300, respectively. That means when power is very great, the average number of iterations will approximate 1. In the other word, there is a very nice performance in convergent speed of the PONET. So PONET indeed have improved the performance of WTA neural network.

Conclusion

We use square and power method to establish new WTA neural networks, the SQNET and the PONET, for improve the performance of convergence. The SQNET and the PONET both employed nonlinear function to do preprocess and combine mean concept of the GEMNET to achieve faster convergent speed. In this paper, we successful in using mathematical induction to prove the convergent speed of the PONET will be faster and faster while its power increases progressively. We use simulation to prove the SQNET and the PONET are faster than the MAXNET, the IMAXNET and the GEMNET. Finally, we use regression to predict the average number of iterations that will approximate 1 in the PONET while power is very great. The SQNET and the PONET indeed improve the performance of convergence in WTA neural network.

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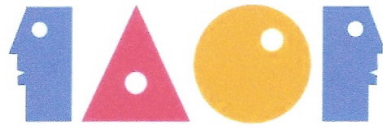
A CASE STUDY OF DYNAMIC COMPETITIVE ADVANTAGE

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Abstract

The research of competitive advantage theory goes through four stages from the classical theory, the exogenous theory, the endogenous theory, and dynamic capabilities. The purpose of this paper was to empirically study the competitive advantage of dynamic capabilities. This study was based on case study method: mainly on literature reviewing, real data collecting and editing, and actual visiting. All materials were summarized and analyzed to discovery their inter-relationship. The study found out four research propositions and proposals. And, the study also pointed out some suggestions for future research and managerial implications.

Key Words: Competitive Advantage, Dynamic Capabilities, Strategic Management, Triangle Audit System

Introduction

How to create and maintain sustainable competitive advantages has been a focal issue in strategic management (Ambrosini and Bowman, 2009; Rumelt, Schendel and Teece, 1994; Teece, 2007; Wang and Ahmed, 2007). Competitive advantage theories evolve in four stages, i.e. early-period theories, exogenous theories, endogenous theories, and dynamic-capabilities theories. This evolution process moves from a focus to static mapping of internal and external environments to an emphasis on external environments of corporates, and from a zoom in on internal environment to the dynamic mapping of internal and external environments.

The early-day theories of competitive advantages are lacking in considerations of internal environment. In other words, corporates can only passively adapt to the environment. These theories ignore the capability to change the environment. Exogenous theories only look at the external environment (i.e. The industry) and overlook the effects of internal conditions (of corporates) on competitive advantages. Endogenous theories represent an important stage of the development of strategic theories, and they include Firm Growth Theory, Resources-Based Theory and Capabilities-Based View of Firm. The Firm Growth Theory studies corporate developments by analyzing the internal resources. It is the theoretic origin of Resources-Based

Theory. Resources- Based Theory to a certain degree makes up the insufficiency of exogenous theories. However, not all the resources can be the foundation of competitive advantages.

Meanwhile, Capabilities-Based View of Firm fails to provide effective and operable methods for the discerning, evaluation, maintenance, accumulation and renewal of core competences. Also, Capabilities-Based View of Firm tends to highlight the effects of techniques, resources and knowledge (i.e. objective manifestations) and to overlook subjective human factors. Dynamic capabilities theories argue that they are the capabilities of a firm to integrate, construct, and align the internal and external factors to adapt to the rapidly changing environment. They are the ultimate key to sustainable competitive advantages (Teece, et al., 1997; Teece, 2007; Wang and Ahmed, 2007). Hence, this study aimed to establish a deeper understanding of the development of competitive advantage theories and to explore, with a case study, the contents of dynamic capabilities described in competitive advantage theories.

Literatures Review

Competitive Advantage Theories in Early Days

The foundation for the development of strategy theories was laid down in this period. Chandler, Ansoff and Andrews

are the three representative scholars at that time. Chandler (1962) develops the implications of "structure follows strategy". Ansoff (1965) suggested that the main tasks for senior executives are to formulate and implement strategic plans. Strategic development is a controlled and aware process of formal planning. Andrews (1971) proposed that strategic management consists of strategy formulation and strategy implementations. Strategy formulation consists of four elements, i.e. market opportunities, firm capabilities and resources, individuals and social responsibilities. Strategy implementations are accomplished with activities such as the allocation of firm resources, the design of organizational structures, incentives, control and leadership.

The competitive advantage theories in the early days came up with SWOT model, a robust framework and an important milestone for the development of strategy theories. In a SWOT model, the external environment stays constant. As long as the firm can adjust its own strengths and weaknesses to respond to the opportunities presented in the external environment and to avoid the threats of the external environment, it can maintain competitive.

The competitive advantage theories in the early days assume that the environments are predictable. In reality, the environment frequently changes due to information incompleteness, environ-

mental discontinuity, and uncertainties. Companies cannot change or control their environments. In fact, it is not even possible to accurately predict what will happen in their environments. Meanwhile, the early day theories fail to consider the internal environment by assuming that companies passively adapt and cannot change the environment.

Exogenous Theories of Competitive Advantages

The competitive advantage theories focused on exogenous factors contribute competitive advantages to external environments. Bain and Porter are the representative scholars. Bain (1959) developed the model of "structure-behavior - performance", and argued that competition is a structural issue. Market behavior or market performances are not a sufficient basis for the determination of the industry competitiveness. Rather, competition depends on market structure and entry barriers.

Porter (1980, 1985) further suggested that performances are a function of industry structures. Market structures determine firm behaviors and firm behaviors affect performances. Porter contributes the source of competitive advantages to industry attractiveness and relative market positions. Industry attractiveness explains the sustainability of competitive advantages, and relative market positions define

the strength/ weakness of competitive advantages.

Therefore, the selection of a suitable industry is the key for a firm to acquire competitive advantages. Porter proposed a Five Forces Model and three generic strategies for competitive advantages, i.e. cost leadership, differentiation, and concentration. Porter's competitive advantage theories demonstrate important implications but they are not without limitations. For example, companies focus on the external environment and they are limited to one of the three generic strategies, without considering the differentiation of firm resources.

In sum, exogenous theories of competitive advantages ignore the effects of internal conditions of a firm on competitive advantages. With the development of relevant theories and practices, exogenous theories of competitive advantages start to crack. Even in the same industry (i.e. The same external environment), there are huge differences in the profitability of different companies. It is difficult to use exogenous theories of competitive advantages to explain scientifically this phenomenon. The differences in profitability of different companies in the same industry often provoke questions on these theories more than the differences in profitability of different industries (Wernerfelt, 1984).

Endogenous Theories of Competitive Advantages

This is an important stage in the development of strategy theories. The endogenous theories of competitive advantages include Firm Growth Theory, Resources-Based Theory, and Capabilities-Based View of Firm.

Firm Growth Theory

Penrose (1959) proposed the Firm Growth Theory, and emphasized that firms are the collection of resources. The process of constructing an analytical framework of firm resources-firm capabilities-firm growth can reveal the inner drivers of firm growth. Nelson and Winter (1982) developed evolutionary economics, and built an evolution model about firm capabilities and behavior. This approach examines the firm growth path from the evolutionary perspectives. It argues that firm growth path is a key determinant of whether a firm can establish competitive advantages. In sum, Firm Growth Theory is a theory about firm developments via the analysis of the internal resources of the firm. It is the foundation of Resources-Based Theory. Firm Growth Theory argues that the generation and accumulation of firm resources is constant and such constancy provides new drivers of growth for a firm.

Resources-Based Theory

This is an important theoretic foundation for the endogenous theories of competitive advantages. Penrose, Wernerfelt, and Grant are the representative scholars and among them, Penrose lays down the theoretic foundation of Resources-Based Theory. Her book "Firm Growth Theory" (1959) is the first attempt that explores the relationship between firm resources and firm growth with economic theories. This approach goes beyond conceptual arguments as it is supported with economics (Foss, 1997). Wernerfelt (1984) published a paper "A Resource-based View of the Firm in Strategic Management Journal. It was not until that paper was selected the best one of the year that Resources-Based Theory received the recognition it deserved (Hoskisson et al., 1999). Wernerfelt (1984) suggested that internal resources of a firm are the key determinant whether it is able to acquire competitive advantages. Firm resources dictate the competitive advantages of a firm in the marketplace.

Grant was the first scholar that refers Resources-Based Theory as a theory. He coined the term "Resources-Based Theory" (RBT) in 1991. During the same year, he established the analytical framework of RBT, and suggested that strategic formulation consists of the analysis of firm resources, firm capabilities, potentials of both, the selection of strategies,

expansion and upgrade of firm resources and capabilities. In sum, RBT is the synthesis of the research on strategic management of its prior four decades (Hoskisson et al., 1999).

Barney (1986) introduced the concept of strategic factors market in the study of competitive advantages. He defined the strategic factors market as the market for the resources required for strategic implementations. It is the inventory of resources accumulated over time with the right path at the right time and the appropriate selection of asset flows. He made two presumptions, i.e. The heterogeneity and a lack of mobility of firm resources for this analytical framework. In other words, the resources of a firm must be valuable, scarce, not completely imitate-able and not completely replaceable, in order to maintain competitive advantages.

Barney (1991) suggested that competitive advantage is the value creating strategy that potential competitors cannot concurrently implement. Sustainable competitive advantages refer to the value creating strategy that current and potential competitors cannot concurrently implement, and cannot imitate or acquire the advantages a firm in question creates from that strategy. In brief, sustainable competitive advantages can last a long period of time. Peteraf (1993) established an analytical model for sustainable competitive advantages, and developed four

criteria for the resources required for sustainable competitive advantages. These four criteria are heterogeneity of resources, ex-post limitations to competition, imperfect mobility, and ex-ante limitation to competition. Hence, Resources-Based Theory holds that economic rents come from competitive advantages (Amit and Schoemaker, 1993; Barney, 1991; Grant, 1991; Peteraf, 1993).

In sum, Resources-Based Theory views that a firm is a collection of a series of resources and each resource serves its own purposes. Competitive advantages stem from the resources owned by a firm (Amit and Schoemaker, 1993; Barney, 1991; Grant, 1991; Peteraf, 1993). External market structures and market opportunities exert certain influence over the competitive advantage of a firm but they are by no means determining factors. Many resources can be acquired from market transactions. Only the capabilities to allocate, develop, protect, utilizes, and integrate resources are the sources of competitive advantages from deep within.

Although the Resources-Based Theory to a certain degree makes up the insufficiency of exogenous-factor theories of competitive advantages, not all the resources can be a source of competitive advantages. In relative competitive market, land, equipment or even human resources can be acquired via market transactions. Therefore, there may not be direct

causal relationship between competitive advantages and certain resources.

Capabilities-Based View of Firm

This theory suggests that core capabilities are the key to create and maintain competitive advantages. Selznick (1957) is the first scholar that came up with the concept of "distinctive competence". The unique capabilities of an organization are the result of different organization maturity and organization atmosphere. Prahalad and Hamel (1990) published a paper "The Core Competence of the Corporation" on Harvard Business Review. This study compared the development of GTE and NEC over the previous decade, and argued that NEC has maintained competitive advantages because it had established core competences. This study sparked a wave of research papers on firm capabilities.

Prahalad and Hamel defined core competences as the collective knowledge of an organization, particularly regarding the learning of how to coordinate a variety of skills and how to integrate the knowledge about different techniques. The three criteria for core competences are the ability to facilitate the entre to multiple markets, the provision of identifiable values to end users, and difficulty for competitors to imitate. Competitors may acquire certain techniques that core competences consist of but they will have difficulties copying the model of internal

coordination and learning. Leonard-Barton (1992) further argued that core competences are the collection of internal knowledge within a company. They comprise of the knowledge and skill sets of employees, technical systems, management systems, and values & norms. However, once core competences have been formed, the problems of core rigidities emerge. This means core competences often make it difficult to change accordingly in a rapidly changing environment. In such instances, core competences are no longer the source of sustainable competitive advantages. Rather, they become obstacles to competitive advantages. However, Leonard- Barton (1992) failed to provide good suggestions regarding how to overcome the problems of core rigidities.

Although Capabilities-Based View of Firm is an important milestone in the development strategic management theories, it is not without theoretic shortcomings. The theory fails to provide effective and operable methods concerning how to discriminate, evaluate, maintain, accumulate, and regenerate core competences. It is mostly about the study of the nature and characteristics of core competences. Capabilities-Based View of Firm focuses on the manifestation of objective factors such as techniques, resources, and knowledge and fails to elaborate on subjective, human factors. Resources-based and capabilities- based theories, particularly with regards to core competences, are hugely

challenged in the hyper competitive environment.

Dynamic Capabilities Theories of Competitive Advantages

The representative scholars for dynamic capabilities theories of competitive advantages are Teece, Pisano, and Shuem (1997). Teece et al. (1997) indicated that dynamic capabilities are the capabilities with which a firm integrate, construct, and re-build capabilities internally and externally, so as to quickly adapt to the rapidly changing environment. They are the ultimately key to sustainable competitive advantages. Such capabilities are dynamic because a firm has to constantly regenerate its capabilities to respond to constant market changes. Capabilities are defined as the ability to renew capabilities (to integrate, construct, and rebuild skill sets and resources within and without an organization with strategic management to meet with the demands in a changing environment. Moreover, the three key factors to the construction of strategic structures with dynamic capabilities are organizational processes, positioning, and development path.

This structure consists of three dimensions: (1)organizational and management processes, i.e. The methods and habits of dealing with things, as well as current learning and implementation models. This contains three aspects, i.e. coordination and integration, organiza-

tional learning, and resources reconstructing and transformation; (2) positioning. The strategic position of a firm depends on its organizational processes and its specific assets, including tangible and intangible assets (e.g. techniques), complementary assets, financial assets, reputational assets, structural assets, system assets, and market assets; (3) development paths, i.e. path dependency with which a firm develops capabilities and functions. The materialization of this concept is an acknowledgment of historical significance. Where a firm is going is restricted to its current position and path ahead, and its current position is a function of the paths it has taken.

After Teece's concept about dynamic capabilities, different scholars started to explain, interpret, and elaborate dynamic capabilities with different points of view. Helfat (1997) indicated that dynamic capabilities are the capabilities that help to create new manufacturing processes or new products and to respond to market changes. Eisenhardt and Martin (2000) suggested that companies respond to or even create market changes through the process of integrating, reassembling, acquiring, and releasing resources. Hence, dynamic capabilities are the organizational and strategic routines with which a firm responds to market changes, conflicts, disconnections, evolutions, and destructions by creating new resource structures.

Subba Narasimha (2001) argued that a firm is essentially a stock of knowledge. Capabilities are a knowledge attribute. When a firm constantly acquires knowledge over time, it also establishes dynamic capabilities. Zollo and Winter (2002) indicated that dynamic capabilities are the capabilities to expand, adjust, or create the original capabilities. They are different from the usual capabilities because dynamic capabilities are changeable. They are the capabilities required to achieve new types of competitive advantages. Teece (2007) suggested that companies should be ambidextrous. The dynamic capabilities required are the capabilities in sensing the market, seizing the opportunities, and reconfiguring resources. In other words, dynamic capabilities are the transformation mechanism in response to environmental changes. Wang and Ahmed (2007) explored the evolution of dynamic capabilities hierarchy and their results highlight the importance of dynamic capabilities.

Finally, Ambrosini and Bowman (2009) proposed a research framework for dynamic capabilities in the value creation process. Also, dynamic capabilities generate four possible outcomes, i.e. The establishment of competitive advantages, transient situations, oppositions, and failures. In sum, dynamic capabilities theories emphasize that capabilities cannot stay static. Rather, they should change along with changes in internal and external environments. These theories establish

a deeper understanding of exogenous and endogenous theories of competitive advantages.

Dynamic capabilities are a major breakthrough in the development of firm capabilities theories. Different from traditional strategy theories, dynamic capabilities are dynamic, complex, pioneering, and capable. They are dynamic because companies can regenerate capabilities to cope with changes in external environments (Teece et al., 1997). They are complex because dynamic capabilities exhibit different characteristics in different environments (Eisenhardt & Martin, 2000). They are pioneering because their focus in innovations and developments, i.e. The abilities to change a firm (Helfat, 1997). They are capable because it is necessary to build, integrate, and reconfigure internal and external capabilities to adapt to the changing environment (Zott, 2003).

Previous studies have examined the relationship between dynamic capabilities and competitive advantages and proposed different perspectives. This study classified the theoretic models of dynamic capabilities and competitive advantages into four types, i.e. capability hierarchy, organizational learning, a dual process, and strategic integration. The purpose is to pursue long-term competitive advantages, a result of the application of dynamic capabilities in a way faster, more effective, and more accurately than competitors (Zott, 2003). Capability hierarchy models

hold that dynamic capabilities are hierarchical. They comprise of organization regeneration capabilities, restructuring capabilities, and process re-engineering capabilities which are higher than the day-to-day operational capabilities. of course, they also contain even higher levels of the capabilities to create new capabilities (Cepeda & Vera, 2007; Wang & Ahmed, 2007; Zollo & Winter, 2002). Organizational learning models argue that dynamic capabilities is a process of organizational learning (Sapienza, Autio, George, and Zahra, 2006; Zollo & Winter, 2002), and this process allows the reconfiguration of organizational rules and the integration of core competences. Strategic integration models suggest that dynamic capabilities are comprehensive. They exhibit static strategic elements and dynamic process characteristics and can be used to assess the strategic status and adjustment features of a firm in a dynamic environment (Teece et al., 1997). Finally, dual process models contend that dynamic capabilities are the capabilities of dual processes, i.e. The transmission of original capabilities and monitoring and adjustment of original capabilities (Schreyogg & Kliesch-Eberl, 2007).

Lei et al. (1996) developed the concept of dynamic core competences, and suggested that dynamic core competences are the systematic meta learning, widely distributed throughout a firm. Meta learning is similar with self-learning, continuous, systematic, complex, and dynamic. It

is the redefinition of the exploration methods for implicit knowledge and the development of professional knowledge on the basis of dynamic procedures. The purpose is to mitigate uncertainties, to prompt a path dependency with fuzzy causality and ultimately to gain sustainable competitive advantages (Hamel, 1991). In fact, the dynamic core competences described by Lei et al. (1996) and the dynamic capabilities proposed by Teece et al. (1997) are similar.

This study referred to both Lei et al. (1996) and Teece et al. (1997) and anchored its discussion on four dynamic-capabilities models, i.e. capability hierarchy, organizational learning, a dual process, and strategic integration, in the context of pursing long-term competitive advantages and the sources of dynamic competitive advantages.

Research Method

This study followed the procedures developed by Yin (1994) and conducted the research in six steps: (1) the research topics and purposes; (2) the establishment of the research structure; (3) the selection of analytic units; (4) the determination on the number of case studies and the selection of research objects; (5) the decision over data sources and collection methods; (6) data analyzes, interpretations, inferences, and conclusions.

The research topics and purposes were mentioned above. Figure 1. illustrated the conceptual structure. This study used firms as analytic units in the examination of dynamic capabilities, and explored competitive advantages of a firm with the perspectives of dynamic capabilities. This study selected LD Group as a case study because it is a mature, large-scale company that has gone through its growth period. The richness and complexity of this case study helped to shed light on the context and relationship of dynamic capabilities. This study gathered data with interviews, observations, information within the sampled organizations, documents, and individual experience as a consultant for over two years.
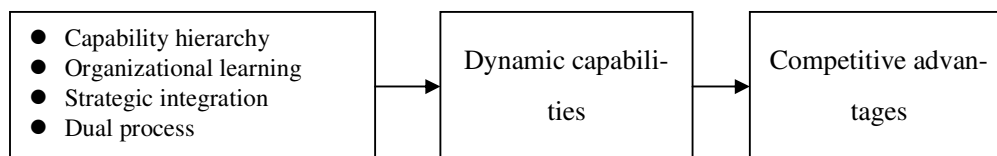

Figure 1. Conceptual Framework of Dynamic Competitive Advantages

When working as a consultant to the company in this case study, the author assisted the company with organizational re-engineering and project improvements. The process involved with regular discussions with staff concerning the action

points, the collection of relevant data (e.g. on-the-spot diagnosis, photo- shooting, datasheet collections, workflow analysis, system reviews, interviews and communication with staff, and observations). Finally, it concluded with decision making over solutions and then started with attack plans. The PDCA cycle of "plans, do, check, act" was the foundation of the consultant's journal, as well as the basis of consultant's performance review. It was also the source of the data analyzed in this study. To ensure the effectiveness of implementations and the direction of the changes, dialogues with senior executives were scheduled on a monthly basis. The purpose was to examine the change process and reflect on the positives and negatives of the transformation strategy. It was worth mentioning that the consulting process in the case study was done by more than two consultants. Each consultant gathered data with different aspects, methods, and sources. The consultants then cross-checked each other's data and brainstormed. This analysis and feedback helped with the accuracy of actions and enhanced the credibility of data interpretations and diagnosis reports. The process enhanced the validity and reliability of the case study, in the same way as Triangle Audit System (Yin, 1994).

This study analyzed data with a description of the development of the company in question by connecting the complex dots throughout the case study. The collection and analysis of data happened concurrently. Gathered data was immediately collated and summarized. The result of the previous literature review served as a guideline for data analysis and all the data concerning the case-study company was generalized and synthesized. Clarifications were made concerning relationships between various factors and related procedures were linked. Finally, this study compared the outcome of strategic implementations by the case-study company with the findings in relevant literature.

Research Analysis

Company Profile

LD Group was established in 1988. Mr. Huang is the founder, CEO, and Chairman. He has 30 years of working experience in the infant products industry. Mr. Huang drives the strategic planning, business development, and day-to-day operations of the firm. The management philosophy of LD Group is "innovation, excellence, integrity, and pragmatism". Innovations refer to the encouragement of new thinking and new ideas for business development. Excellence equates to the constant endeavor for the better, by improving production techniques and operational efficiency. Integrity is the sincere attitude and efforts to win trust and support within and outside the company. Pragmatism indicates a gradual approach to achieving sustainable growth.

LD Group is a designer, manufacturer, and marketer of products for infants and preschool children. Its product portfolio includes baby strollers, baby beds and play yards, highchairs, rocking chairs, infant seats for cars, motorized vehicles and other accessories. LD Group strives to produce innovative quality products in compliance with the highest safety standards around the world. LD Group has set up manufacturing facilities in Zhongshan, Guangdong and Shanghai, China. It has R&D centers in both Taiwan and China. The company works as an ODM with solid R&D efforts. In 2008, it had more than 366 products and 727 registered patents. LD Group is known for its manufacturing experience and product quality. Most of the company's products are sold to the U.S. and Europe.

To augment its supply chain, LD Group established GuoHong Plastic Manufacturing in Zhongshan City, Guangdong Province, in 1997, with a capitalization of NT$150 million. The manufacturing site commands a total area of 12,000 square meters and it hires approximately 210 operators. It produces a variety of infant prams, baby beds, luggage wheels and plastic products. It started with the manufacturing of EVA foam wheels and extended to the manufacturing of compound plastic inflatable wheels and inflatable wheels made of environmental friendly materials. Its current offerings include foam wheels, inflatable wheels, and plastic products. It is the

first company that developed new materials for inflatable wheels, which are aesthetically attractive, practical, durable, and environmental friendly. These products are currently applying for patents in China. The firm emphasizes management, R&D, and professionalism, from molding to forming. In March 2000, it obtained the certification from ISO—9002 certification and in May 2003, got ISO--9001: 2000 certification.

To brace for the arrival of an aging society, the company established a division of medical devices and entered the market of motorized vehicles in 2001. In 2004, the company extended operations into the medical equipment markets in the Americans, Europe, Australia, and some Asian countries by designing, developing, and innovating mobility products for the disabled or the elderly. The offerings range from mobility aides and commode chair for stay-homes to motorized vehicles and wheelchairs for going-outs. The non- power products include wheelchairs, mobility aids, table chairs, bath chairs, elevated toilet seats, toilet racks, and monkey poles. Powered ranges include motorized vehicles, foldable electric wheelchairs, and stationary electric wheelchairs. Dedicating to R&D, the company aims to establish a global brand with global footprint, in order to create higher profits and value.

LD Group's infant products are sold all over the world under the brand name

"Angel". Its products are renowned for quality, safety, and reliability. The company is widely recognized for its production capability, leading R&D, and designs that are able to keep up with those of the counterparts in the US and Europe. In September 2006, the company was awarded "Famous Brand in Guangdong". In September 2007, it was recognized as a Chinese Top Brand. In December 2008, its products were given the "national inspection-free" status. LD Group offers a comprehensive portfolio of infant products (including strollers, beds, feeding products and other accessories). The brand name "Angel" conveys the message for an angel's heart and parents' love. LD Group spares no efforts in the design of the newest and best products for overseas and the introduction of such products to the Chinese market the earliest as possible. This is to make sure Chinese consumers can enjoy the premier products/services available to the international market.

LD Group decided to enter the Greater Chinese market to meet the needs of consumers. In August 2007, Zhongshan LD Qihang Co., Ltd. was established, to build the distribution network under the brand name "Henry & Jamy". In 2008, the company set up branches in Guangdong, Guangxi and Fujian. It currently has over 30 chain stores. "Henry & Jamy" offers one-stop shopping for infant products of different brands. In 2008, LD Group started to extend its geographic

reach and intended to become No. 1 chain stores for infant products in China within three years.

Research Findings

Capability Hierarchy of LD Group

Over the past two decades, LD Group has been developing its core competences by matching capabilities with resources. With different dynamic capabilities by functions, LD Group has been extending cross-disciplinary capabilities on the top as well as operational specialization capabilities on the bottom. The purpose is to ensure the solidness of its abilities in the capability hierarchy. Meanwhile, LD Group has been, over the past 20 years, building three capabilities, i.e. capability acquisitions, capability regeneration, and capability allocations with strategic operations. Capability acquisition refers to the capability of technical knowhow and management. For example, to enter the motorized vehicle market, LD Group purchase some packaged patents for the knowhow covering the whole of a motorized vehicle from an Australian company. With regards to management capability, LD Group hires management consultants each year to assist in the construction and adjustment of its management system, in the establishment of the ISO quality control system, and in the certification of FDA licenses. To create entry barriers to competitors and make it impossible for others to imitate its techni-

cal knowhow, LD Group absorbs new knowledge and obtains new technologies and patents, and essentially enhances the regeneration of its capabilities. Its R&D in the controllers of motorized vehicles is the best example. The problems in sales department somehow affect the production department, and the quality of R&D projects affects the development of products. Also, the professionalism in engineering affects the conditions of production. It is worth noting that all these interdependent relationships vary in degree, depending on the level of technical sophistication. The allocation of capabilities is often the contributor to overall performances.

The results of the literature review suggested that dynamic capabilities are hierarchical. They comprise the low-level capability for day-to-day operations and the high-level capabilities for organization regenerating and restructuring, and workflow reengineering. These high-level capabilities also include the capabilities to acquire, allocate, and regenerate. At the highest level, there are the capabilities of strategic reasoning, new-capability creating, and environmental-adapting(Cepeda & Vera, 2007; Luo, 2000; Sanchez, 2004; Wang & Ahmed, 2007; Zollo & Winter, 2002). Hence, this study developed Proposition I.

Proposition I: the hierarchy capability for various dynamic capabilities was the higher level capability in strate-

gic reasoning, new-capability creating, and environmental-adapting.

Organizational Learning of LD Group

The performances of LD during the previous two decades are driven by the momentum of organizational learning. LD Group obtains, digests, transforms, and utilizes knowledge through the processes of certification and redefinition of organizational norms so as to synthesize its core competences. In 1996, it acquired the certification for ISO 9002:1994. In 2000, it went for an IPO in Hong Kong. In 2002, it passed the assessment of the DNV: ISO 9001:2000 quality management system. In 2004, it made its first foray into the medical equipment market. In 2006, its infant stroller under the brand name "Angel" was recognized as a top brand in Guangdong Province. In 2007, it was awarded as a top brand in China. In the same year, its baby strollers and motorized vehicles obtained China Compulsory Certification and its prams under the brand name Angel was awarded "Chinese national inspection- free" status. In 2008, it passed the DNV: IECQ QC080000: 2005 certification for the control of hazardous substances in the manufacturing process.

LD Group implemented a five-pronged strategy to promote organizational learning through the certification of quality management systems. First, it chooses good suppliers able to meet its

standards and requirements. Second, it establishes a comprehensive system for the inspection of procurements to ensure the acceptable rate of its own products. Third, it promotes the control over manufacturing processes. Fourth, it ensures the quality of final products. Fifth, it sets up professional labs and equipment for inspection and quality assessments. In fact, the organizational learning within LD Group requires training of the personnel involved in inspection, testing, and management. The purpose is to establish standard procedures, achieve implementation requirements, and ensures quality management.

In addition, LD Group reports good results in the utilization of knowhow in lean production. It streamlines its manufacturing model by changing production workflows. To save manpower required on the assembly lines, LD Group trains its staff for multiple tasks. Starting in 2002, LD Group has been introducing automated cropping/cutting equipment from Spain to automate the processes from product design to forming.

The literature review also revealed that dynamic capabilities are a process of organizational learning. They include knowledge acquisition, knowledge digestion, knowledge transformation, and knowledge utilization to reconfigure or-

ganizational norms and synthesize core competences (Sapienza et al., 2006; Zollo & Winter, 2002; Zott, 2003). Hence, this study proposed Proposition II.

Proposition II: Dynamic capabilities illustrated their formation and evolution process via organizational learning, so as to reconfigure organizational norms and synthesize core competences.

Strategic Integration within LD Group

Figure 2. depicts the strategic integration within LD Group over the past 20 years. Founder Mr. Huang delivered a speech in a team-building offsite in 1995. "The year 1994 marked our sixth year of our efforts in the infant stroller market from our headquarters in Zhongshan, Guangdong. There are more than 15 competitors here alone and they all target at our market share. I believe that a global battle for the infant stroller market is imminent and it will be a tough one. We cannot back out and we can only march forward. We can only survive after we have defeated our opponents. and the only way to do so is to attack, time and again. How? Firstly, we need well designed products as our weapons. Secondly, we need to train employees as our warriors. Thirdly, we need a thorough strategy.
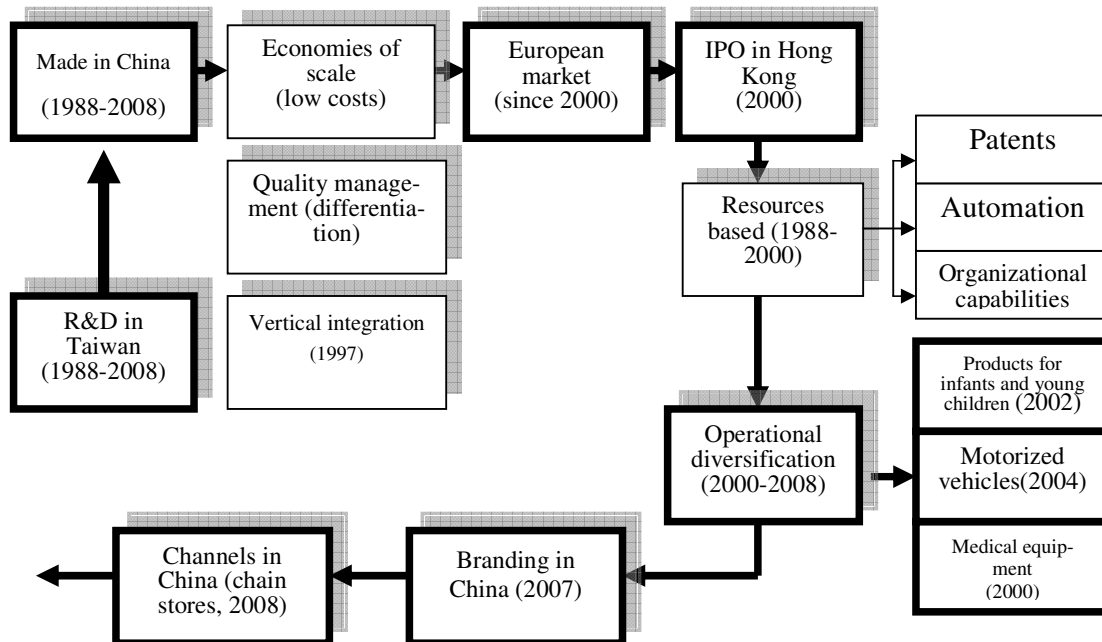
Figure 2. Strategic Integration with LD Group

Source: This study (bold lines indicating the process of capability transmissions and monitoring)

All these three require us to work together as a team, to fend off our enemies. Now, I would like to announce that we have managed to secure 50% market share in the US in 1995. We will be entering the Japanese market at the end of 1995 and we will have 50% market share in Japan by 1998. We will have at least 50% market share in Europe by 2000. I hope we become the largest and the best manufacturer in the world for infant strollers." His audience gave an enthusiastic round of applause immediately after his talk. The atmosphere was joyful, amid big red banners, crimson table clothes, and colorful balloons.

In August 1996, LD Group's facilities in Zhongshan acquired the ISO-9002 certification. In 1998, it established an electric toy department. In 2001, it set up a medical equipment department. In 2002, it obtained the ISO-9001:2000 certification. In 2005, its subsidiary in Taiwan and the headquarters in China received the ISO- 13485, ISO-9001 and the GMP certifications, respectively. During the same year, the company had a total of 592 patents around the world and a total of 268 patent applications pending. It had become the largest manufacturer of infant strollers in the world. The promise Mr. Huang gave in 1995 was indeed realized by LD Group.

The literature review found that dynamic capabilities are comprehensive. They include static strategic elements and

dynamic process characteristics. They can be used to evaluate the strategic positioning and adjustment features of a company in a dynamic environment (Teece et al., 1997). Hence, this study developed Proposition III.

Proposition III: Dynamic capabilities were the dynamic evolution of static strategic elements and dynamic processes.

Dual Process of LD Group

Figure 2. shows the process of LD Group's development over the past 20 years with R&D center in Taiwan and low-cost manufacturing in China. The company spent 12 years on the establishment of economies of scale, management of quality, and strategies for vertical integration. In 2000, LD Group pursued diversification on the top of the resources and capabilities it had accumulated, and the access to the capital market in Hong Kong. It entered the products for infants and young children, medical equipment, and motorized vehicles market. In 2007, it started to build its own brand and channel in China. The strategic dynamics in the adjustment to environ- mental changes and the establishment of its competitive advantages are also a trans- mission process of its dynamic capabilities.

The literature review suggested that dynamic capabilities are a process of capability transmissions and monitoring.

The monitoring of dynamic capabilities includes the examination of internal and external environments, the control over day-to-day operations of a firm, and the self-inspection of the predicament to organizational capabilities. The first two processes are elaborated in the traditional theories of organizational capabilities. The examination of internal and external environments is not only the basis for the management of daily operations, but also the foundation for decisions over strategic adjustments. The observation of daily activities and the adoption of timely and appropriate precautions are important to the assurance of effective implementations of existing strategies. The third process is unique to the process of dynamic capabilities. The monitoring of environment changes facilitates decisions over capability adjustments after the identification of potential challenges to firm capabilities and the detection of changes in either internal or external environments. The facilitation is achieved through path dependency, structural inertia, and psychological commitments. The ultimate goal is to ensure the realization of daily capabilities and the improvement of firm capabilities. In such instances, the transmission process of organizational capabilities is both the results of internal development of capabilities and the outcome of adjustments via capability monitoring. This also shows that the process of capability transmissions and flexible monitoring is organic and holistic. These elements form the framework of dynamic

capabilities (Schreyogg & Kliesch-Eberl, 2007). Hence, this study proposed Proposition IV.

Proposition IV: Dynamic capabilities were dual-process capabilities. They comprised of the transmission process of existing capabilities and the process of monitoring and adjusting the existing capabilities.

Conclusion and Suggestions

Practical Implications

This study concluded the following four findings:

1. The hierarchy capability for various dynamic capabilities was the higher level capability in strategic reasoning, new-capability creating, and environ- mental-adapting.

2. Dynamic capabilities illustrated their formation and evolution process via organizational learning, so as to reconfigure organizational norms and synthesize core competences.

3. Dynamic capabilities were the dynamic evolution of static strategic elements and dynamic processes.

4. Dynamic capabilities were dual-process capabilities. They comprised of the transmission process of existing capa-

bilities and the process of monitoring and adjusting the existing capabilities.

Hence, this study suggested that dynamic capabilities were hierarchical. They were capabilities with dynamic evolution processes, as well as processing capabilities. They included the transmission process of existing capabilities and the adjustment of such existing capabilities via monitoring and organizational learning.

This study proposes the following two practical implications. Firstly, dynamic capabilities aimed to quickly adapt to the rapid changes of the external environment. They were the capabilities to build, integrate and reconfigure the capabilities of a firm internally and externally. Dynamic capabilities would be a habit acquired by an organization. They could adjust and change core competences in order to have effects on competitive advantages. Secondly, to achieve competitive advantages in a dynamic competition and respond to environmental changes, it was necessary to identify potential market opportunities, to reconfigure and transform resources internally and externally, to maintain organizational learning, to rapidly improve or innovate products/services, and to monitor/adjust existing capabilities.

Suggestions for Follow-Up Studies

This study made the following suggestions to follow-up research projects.

First, this study examined the sources of dynamic competitive advantages with four models, i.e. capability hierarchy, organizational learning, a dual process, and strategic integration. Subsequent studies might explore how these models interact with each other and what the influencing factors are. Second, this study conducted a case study in the investiga-tion of dynamic competitive advantages. Follow-up studies might examine companies in different industries or conduct multiple case studies. Third, different factors such as the effects of the industrial structure, the effects of firm sizes, and differences in geographic locations could be included as modulating variables for further studies.

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DOES THE ALTERNATIVE ATTRACTIVENESS SWITCH TOURISTS' INTENTION IN AGRITOURISM?

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Abstract

Destination attractiveness is an important indication of tourists' attraction to a destination. Numerous researchers study its impacts on tourists' behavior/behavioral intention. However, fewer research focus on the alternative ones. The objective of this study is mainly to establish the TPB model to agritourism context in Taiwan and to examine the moderated effects of alternative attractiveness. Questionnaire was designed based upon literature review and data were collected by questionnaire survey and a total of 400 valid questionnaires were received. The findings show that the TPB model is adequate to Taiwanese agritourism and the moderated effects are also verified. Specifically, the alternative attractiveness can

not only destroy the attitude-intention relationship but also enhance behavioral control- intention relationship. Finally, suggestions such as "managers need the support of a range of important people and organizations in order to undertake agritourism planning" are offered for practical managers.

Key Words: Alternative Attractiveness, Agritourism, Behavioral Intention, Theory of Planned Behavior

Introduction

Over the last decade, the number of inbound tourists is increase from 2.9 million to 6.08 million in Taiwan. The majority of inbound tourists are from mainland China since 2009 (Tourism Bureau, R.O.C., 2012). Most of those tourists, however, visit famous sites, i.e. 101 Building, National Palace Museum, Sun Moon Lake, Alishan etc. Some tourists comment that they waste too much time on traffic jam and waiting for visiting the site. The huge crowds of people in the same time to the destination might destroy the service quality of the service providers and finally the total revenues of tourism industry in Taiwan would have higher probabilities to be destroyed (Yen, 2011). Research has argued that the tour should be rearranged and agritourism was a reasonable consideration for those problems (Yen, 2009). How to attract them to agritourism is an important issue for its development. Understanding their future intentions and offering some guidance are important and can benefit the industry for its development.

However, research about how to attract tourists to agritourism in Taiwan is rare and so do behavioral intentions/ future intentions to those ones. Given that, the investigation of the underlying factors that led to tourists' intentions to visit agritourism in Taiwan, while considering both social and nonvolitional components, will provide further insight into their decision-making processes, thereby helping us better understand their behaviors, which is essential for the development of agritourism marketing/service strategies in Taiwan. Therefore, the theoretical framework for this study derives from Ajzen's (1985, 1991) Theory of Planned Behavior (TPB) which has strong predictive utility for a wide range of human behaviors. Han, Hsu, and Sheu (2010) have demonstrated that the Theory of Reasoned Action (TRA) solely focuses on volitional personal/social factors when explaining individual's intention formation. TPB is a more comprehensive version of the TRA and allows this study to examine the influence of personal determinants and social surroundings as well as non-volitional determinants on intention (Han *et al.*, 2010). In particular, it could contribute to

improving the prediction of tourists' intention to choose a agritourism in Taiwan.

Furthermore, researchers have demonstrated that the decision-making processes of a tourist can be influenced by family, reference group, and situation factors (Kotler, and Armstrong, 2012; Yen, Liu, and Chen, 2012). One claimed that situation factors, i.e. switching cost and alternativeness, can decline satisfaction-commitment relationship (Liu, Yen and Huan, 2010). No study challenges the role of any situation factors in TPB model. To clarify the role of situation factor in TPB model can also extend its application.

Due to the research background mentioned above, alternative attractiveness will be integrated into the TPB in the current study. TPB has been successfully tested in a wide range of contexts, disciplines and countries, including tourism and hospitality (Sparks and Pan, 2009). For example, the TPB has been applied to transportation mode choices (Bamberg, Ajzen, and Schmidt, 2003), the influence of negative word- of-mouth on Chinese consumers' intentions to choose restaurants at which to dine (Cheng, Lam, and Hsu, 2006), attitudes toward wine tourism (Sparks, 2007), Taiwanese travelers' choice of Hong Kong as a travel destination (Lam and Hsu, 2006) and Chinese outbound tourists' attitudes toward international travel (Sparks and Pan, 2009). Consequently, the TPB seems to be an

appropriate framework in the current context. The objective of this study is to establish a TPB model to agritourism context; to clarify the role of alternative attractiveness in TPB; and to offer some suggestions to practice. The research framework is drawn in Figure 1.
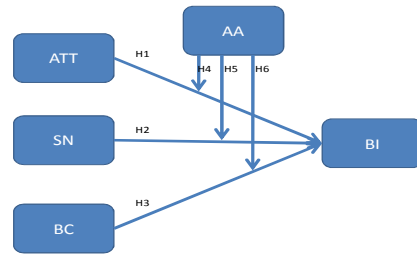
Figure 1. Research Framework

Literature Review

The TPB has been examined in previous studies in many Asian countries, including South Korea (e.g., Huff and Alden, 2000; Lee and Green, 1991; Oh, Ahn, and Kim, 2003; Park and Blenkinsopp, 2009) and China (e.g., Lam and Hsu, 2006; Lee, 2000; Singh, Fassott, Zhao, and Boughton, 2006; Song, Wanberg, Niu, and Xie, 2006, Sparks and Pan, 2009). The basic paradigms of Ajzen's (1985, 1991) TPB are that people are likely to carry out a particular type of behavior if they believe: (1) such behavior will lead to an outcome they value, (2) their important referents will value and approve of the behavior and (3) they have the necessary resources, abilities and opportunities to perform such behavior (Lam and Hsu, 2006). Specifically, atti-

tudes, subjective norms and perceived behavioral control influence behavioral intentions.

1. ATT

TPB assumes attitude toward a behavior, subjective norm, and perceived behavioral control are three conceptually independent determinants of behavioral intention (Han *et al.*, 2010). The first important determinant of behavioral intention is attitude (ATT), which can be described as "the degree to which a person has a favorable or unfavorable evaluation or appraisal of the behavior in question" (Ajzen, 1991, p. 188). One states that attitude toward a behavior represents the perceived consequences of the behavior and his/her evaluation of the significance of the consequences (Eagly and Chaiken, 1993). Another demonstrates that AT is the feelings of favourability or unfavourability toward performing a behavior (Chou, Chen, and Wang, 2012); represents a person's overall positive and negative beliefs and evaluations of the behavior (Cheng, Lam, and Hsu, 2005). Others argued that an ATT is an individual tends to possess a favorable attitude when the outcomes are positively evaluated and, thus, he/she is likely to engage in that specific behavior (Ajzen, 1991; Cheng *et al.*, 2006); a favorable or unfavorable predisposition to respond in a consistent way toward an object, such as a holiday choice (Lam and Hsu, 2006; Moutinho, 1987). In other words, tourists' attitude toward to

agritourism is his/her evaluation of the significance of the consequences/ outcomes for agritourism. Based on the TPB, hypothesis is developed:

H1: attitudes toward to agritourism of tourists have positive influence on their behavioral intentions.

2. SN

Subjective norm (SN) is an individual's perception of general social pressures from important others to perform or not to perform a given behavior (Cheng *et al.* 2005). SN measure the importance people attach to reference groups' endorsements and people's willingness to conform to these groups' shared beliefs, attitudes and choices, such as their holiday choices (Moutinho, 1987). It reflects the perceived desire of significant referents to approve or disapprove of a particular behavior (Chou *et al.*, 2012). In turn, it is the social pressures from reference groups to approve or disapprove of agritourism. Based on the TPB, hypothesis is developed:

H2: subjective norm of tourists have positive influence on their behavioral intentions.

3. BC

Perceived behavioral control (BC) refers to an individuals' perception of the ease or difficulty of performing a behav-

ior (Ajzen, 1991) and directly affects intention and behavior. BC is a measure of the difficulty people attach to the performance of a behavior, such as making holiday choices (Lam and Hsu, 2006). Another states BC is related to perceptions of internal and external constraints on performing a behavior (Chou *et al.*, 2012). In turn, it is a tourists' perception of the ease or difficulty when travel in agritourism. Based on the TPB, hypothesis is developed:

> *H3: perceived behavioral control of tourists have positive influence on their behavioral intentions.*

4. AA

Alternative Attractiveness (AA) refers to customer perceptions regarding the extent to which viable competing alternatives are available in the marketplace (Jones *et al.*, 2000). In this study, AA is a tourist's perceptions regarding the extent to which viable competing alternatives are available in the tour site. When consumers perceive few viable alternatives, the perceived benefits of defecting should be relatively low, resulting in higher levels of retention. In relation to the TPB, the influence of the self motivation to improve one's behavior intention is likely to be mediated by the individual's attitude (Hillhouse et al., 2000). It is also possible that appearance motivation might moderate the relationship between the attitude and intention. Empirical evidence across a

number of areas including interpersonal relationships and employee turnover (Rusbult, 1980; Farrell and Rusbult, 1981), as well as channels relationships (Ping, 1993) supports this line of reasoning and demonstrates that when viable alternatives are lacking, the probability of terminating an existing relationship decreases.

The study underscores the importance of alternative attractiveness in consumers' decisions to switch. Consumers may be lured to a more attractive destination even in the absence of factors at the origin acting to push them away (Bansal et al., 2005). In other words, tourists might have higher probabilities to stay in the existing relationship while viable alternatives are lacking; lower probabilities to stay while viable alternatives are met. Therefore, AA might act a situational factor in tourists' decision- making. Hence, the following hypothesis is developed:

> *H4: As perceived alternative attractiveness increase, the relationship between attitude and behavioral intentions will diminish (i.e., alternative attractiveness ×attitude interaction).*

> *H5: As perceived alternative attractiveness increase, the relationship between subjective norm and behavioral intentions will diminish (i.e., alternative at-*

tractiveness ×subjective norm interaction).

H6: As perceived alternative attractiveness increase, the relationship between perceived behavioral control and behavioral intentions will diminish (i.e., alternative attractiveness ×perceived behavioral control interaction).

Methodology

Having considered the data collection requirements of this study such as a need of large sample of customers and quantities of Taiwanese agritourism, it would be appropriate to employ the field survey with a self-administered questionnaire as the primary data collection technique for this study. The field study method was chosen in order to gain information directly from individuals at the leisure farm settings. As such, their feelings and perceptions about the setting with respect to attitude (AT), subjective norms (SN), perceived behavioral control (BC), behavioral intentions (BI) and attractive alternativeness (AA) are likely to be clearly in mind (Danaher and Mattsson, 1994).

To ensure the content validity of the scales, the items selected constructs are mainly adapted from prior studies. The study uses exiting scales for measuring attitude, subjective norms, perceived behavioral control, behavioral intentions and

attractive alternativeness. Items for AT, SN, BC, and BI were drawn based on the studies of Han et al. (2010) and Quintal, Lee, and Soutar (2010). Items for AA were drawn based on the studies of Han *et al.*, (2009) and Jones *et al.* (2000). The initial items were confirmed and corrected by the managers of leisure farms and pretested was done by EMBA (Executive Master of Business Administration) students in NPUST (National Pingtung University of Science and Technology), Taiwan. For items, responses were ratings from 1 to 7. The anchors are "strongly disagree" (1) and "strongly agree" (7) for measuring SN, BC, BI, and AA. The anchors for AT are extremely bad (1)/extremely good (7), extremely undesirable (1)/extremely desirable (7), extremely unpleasant (1)/extremely pleasant (7), extremely foolish (1)/extremely wise (7), extremely unfavorable (1)/extremely favorable (7), extremely un-enjoyable (1)/extremely enjoyable (7), and extremely negative (1)/extremely positive (7). It was decided that the model would be tested by collecting data from leisure farms in Taiwan. The criteria for farms' selection were based on their service quality of experience, food and beverages, and accommodation certified by Taiwan Leisure Farms Development Association (TLFDA). Finally, a total of 23 farms were drawn and could be categorized into full-service farms and limited-service farms. They were selected expecting adequate diversity of quality and loyalty to allow a model to be estimated. A ques-

tionnaire was prepared for collecting rating and other information. Items measuring the various constructs were distributed about in the questionnaire to reduce halo effects.

Because the goal was to develop a model, random sampling was not seen as necessary. Surveyors were collecting data from tourists they did not know. Quota sampling was adapted to ensure that respondents were distributed across age and sex groups. Having enough respondents in certain categories was seen as important for data to be appropriate for estimating the model of concern. Data was collected by personal contact with respondents at rest area of the farm. In collecting data, respondents were asked to complete a printed questionnaire. The data collectors, as necessary, clarified the meaning of questions and answers. In other words they dealt with any problems encountered while answering questions. Data were collected during the June to August in 2012. A total of 400 valid questionnaires were received. of 400 questionnaires obtained, about 55.5% were male and 45.5% were from female respondents. At about 16.8% of respondents were below 20 years of age and 13.6% of respondents were higher than 40 years of age. The majority of respondents were between 20-40 years of age (69.8%). Approximately 7.1% of respondents were not graduated from junior high school and 26.5% of respondents were graduated from junior high school. At about 65.4% respondents

were graduated from college or above. With regard to the frequency visited, 75% of respondents were first time to the destination and 25% were revisit.

Results

A confirmatory factor analysis (CFA) using AMOS 17.0 and SPSS 17.0 were conducted to test the measurement model and hypothesis. Before testing the model, the data were examined. For making maximum likelihood (ML) estimates for path models (Kline, 1998), there are problems if certain conditions arise. There are likely to be outliers if the absolute value of skewness is greater than 3. Also, there is a distribution problem if the absolute value of kurtosis is larger than 10. One wants data that is approximately normally distributed for making ML estimates. For this research the skewness of variables ranges between -1.282 and -0.311 (Table 1) so the < 3 criterion is met. The kurtosis values are between 2.183 and -0.622 so the < 10 criterion is met. Therefore, this enables authors to proceed in evaluating the measurement models.

The chi-squares (327) is significant (p < 0.05; Bollen, 1989), a finding is not unusual with large sample sizes (Doney and Cannon, 1997). The ratios of chi-square to degrees of freedom (df= 139) are 2.35 for measurement model within the acceptable range of 2 to 5 (Marsh and Hovecar, 1985). The values for GFI (0.921), AGFI (0.892), CFI (0.973), and

RMSEA (0.058) are acceptably close to the standards suggested by Hu and Bentler (1999) greater than 0.9 for GFI and AGFI, greater than 0.95 for CFI and less than 0.08 for RMSEA. Given that these batteries of overall goodness-of-fit (GFI) indices were accurate and that the model was developed on theoretical bases, and given the high level of consistency samples, no respecifications of the model were made. This enables authors to proceed in evaluating the reliability and validity.

This study assesses the quality of measurement efforts by investigating uni-dimensionality, convergent validity, reliability, and discriminate validity. Evidence for the uni-dimensionality of each construct included appropriate items that loaded at least 0.740 on their respective hypothesized component and loaded no larger than 0.30 on other components in a factor analysis (see Table 1). In addition, the overall goodness of fit supports uni-dimensionality (Steenkamp and van Trijp, 1991). Convergent validity was supported by all loadings being significant (p < 0.01) and nearly all SMC (square of multiple correlation) exceeding 0.30 (Hildebrandt, 1987). This study assesses reliability jointly for all items of a construct by computing the composite reliability (C.R.) and average variance extracted (AVE) (Baumgartner and Homburg, 1996; Steenkamp and van Trijp, 1991). For a construct to assess good reliability; composite reliability should be higher than 0.70, and the average variance extracted should at least be 0.60 (Bagozzi and Yi, 1988). All scales demonstrate good reliabilities.

To examine discriminant validity, Current study first checks the coefficients of correlations between factors whether they are significantly lower than 1 and then compared the correlations between factors with their AVE (Gaski and Nevin, 1985). The results show that all of coefficients of correlations between factors are significantly lower than 1 and the correlations between factors are lower than their AVE, thus confirming discriminant validity (see Table 2). In summary, the measurement model demonstrates adequate unidimensionality, convergent validity, reliability, and discriminant validity. This enables authors to proceed in evaluating hypotheses testing.

First of all, the path attitude (AT) - behavior intentions (BI) was tested (Table 3, M1). The model indices were accurate (χ^2=69.12; p=.000; df=23; GFI=.964; AGFI=.929; CFI=.983; RMSEA=.071) and the coefficient was significant. Then the subjective norm (SN) was added into the model (M2). The model indices were accurate (χ^2=146.92; p=.000; df=48; GFI=.940; AGFI=.902; CFI=.976; RMSEA=.072) and the coefficient was significant. Lastly the perceived behavioral control (BC) was added into the model (M3) and accurate model indices were met (χ^2=207.64; p=.000; df=81;

GFI=.934; AGFI=.902; CFI=.975; RMSEA=.063). AT can positively and significantly impact BI (t= 2.356; β= .110); SN can positively and significantly impact BI (t= 5.605; β= .364); BC can positively and significantly impact BI (t= 5.500; β= .374). In general, 54.7% variance of BI can be explained by AT, SN, and BC. Consequence, H_1, H_2, and H_3 were supported. Furthermore, the first moderator alternative attractiveness × attitude (AA*AT) was added into the model (M4). The model indices were accurate (χ^2=226.64; p=.000; df=92; GFI=.933; AGFI=.901; CFI=.974; RMSEA=.061) and the coefficient was significant (t= -1.833; β= -.078). Then alternative attractiveness × subjective norm (AA*SN) was added into the model (M5). The model indices were accurate (χ^2=242.16; p=.000; df=103; GFI=.933; AGFI=.900; CFI=.974; RMSEA=.058) and the coefficient of AA*AT was significant (t= -2.192; β= -.104) but AA*SN was not (t= 1.126; β= .053).

Lastly the alternative attractiveness × perceived behavioral control (AA*BC) was added (M6). The model indices were accurate (χ^2=262.54; p=.000; df=114; GFI=.931; AGFI=.897; CFI=.973; RMSEA=.057) and the coefficient of AA*AT (t= -2.444; β= -.117) and AA*BC (t= 2.105; β= .098) were significant but AA*SN was not (t= .119; β= .006). Totally 56.2% variance of BI can be explained by AT, SN, and BC. Conse-

quence, H_4 and H_6, were supported and H_5 was not.

Conclusion

In general, the TPB was supported and extended by this study. The findings of this study provide both theoretical and managerial implications for comprehending the determinants of tourists' intention to undertake Taiwanese agritourism.

First, the significant 'attitude-intention' relationship provided strong support that tourists' positive attitudes towards agritourism strengthen intentions to undertake agritourism, while negative attitudes weaken them. This study identifies attitude as a key factor influencing tourists' intention of agritourism planning. This demonstrates Chinese tourists' intention will be higher when their evaluations of the significance of the consequences/outcomes for Taiwanese agritourism are high. Furthermore, the significant 'subjective norm-intention' relationship also provided strong support that tourists' decision making was influenced by a reference group. Results highlight the role that significant others played in influencing the implementation of agritourism planning, and thus confirmed socio-cultural norms as a key influence on agritourism planning (Méheux and Parker, 2006). This indicates Chinese tourists' intention will be higher when the social pressures from reference groups to approve of Taiwanese agritourism.

Moreover, the significant 'perceived behavioral control - behavioral intention' relationship also provided strong support that tourists' that tourists' positive perceived behavioral control strengthen behavioral intentions to undertake agritourism. It reveals Chinese tourists' intention will be higher when their perceptions of the ease are high.

Nevertheless, one more findings are unusual when situational variable, alternative attractiveness, is considered. First of all, the higher attitude perception of a Chinese tourist perceived, the lower intention revealed. It indicates the 'attitude-behavioral intention' relationship could be detracted by the higher alternative attractiveness. Furthermore, the higher perceived behavioral control perception of a Chinese tourist, the higher behavioral intention will present. The 'perceived behavioral control - behavioral intention' relationship could be enhanced by the higher alternative attractiveness. However, alternative attractiveness can not detract or enhance 'subjective norm-intention' relationship indicate it is probably a partially moderator in TPB model. That result inferred visitors may mostly participate in group inclusive tour (GIT) from Hong Kong.

Consequently, this study concludes three individual factors (attitude, subjective norm and perceived behavioral control) are identified as the key factors in-

fluencing agritourism planning behavior in Taiwan. Based on these findings, the implications are that interventions could be targeted, for example, at changing attitudes towards agritourism planning behavior, applying more social pressure, and sharing past agritourism experience. This study, then, contributes to theoretical advancement in the field of agritourism planning through adopting an empirical approach using an established theory (TPB) to explain behavior.

The practical implications could be drawn. For example, it broadens the knowledge of the drivers of agritourism planning which could benefit managerial planning and practice. For instance, managers need the support of a range of important people and organizations in order to undertake agritourism marketing planning. Supervisors, peers, industry associations and government all have a role to play in shaping social norms and attitudes which ultimately influence agritourism planning. Top management needs to articulate the importance of agritourism planning by embedding it in service strategic plans and including it as a core competency and key performance indicator of managers. Tourism associations in particular could play a role in changing attitudes through the provision of tool kits and grand tour demonstrating the

Table 1. Reliability and convergent validity

Concept	Items	Mean	SD	Skewness	Kurtosis	λ	SMC	CR	AVE
BI	BI1	5.43	1.083	-.473	-.035	.864	.746	0.85	0.72
	BI2	5.30	1.099	-.633	.719	.873	.762		
	BI3	5.25	1.273	-.763	.655	.820	.673		
AA	AA1	4.98	1.453	-.443	-.530	.893	.798	0.94	0.83
	AA2	4.88	1.430	-.335	-.622	.930	.865		
	AA3	4.90	1.522	-.405	-.553	.935	.875		
	AA4	4.82	1.520	-.394	-.573	.878	.771		

Note: χ^2=327(p=.000); df=139; GFI=.921; AGFI=.892; CFI=.973; RMSEA=.058

SMC: Squared Multiple Correlations; CR: Composite Reliability; AVE: Average Variance Extracted

Table 2. Discriminate validity and correlations between concepts

Concept	M	SD	AT	SN	BC	BI	AA
AT	35.22	5.65	0.70				
SN	16.38	3.13	.465**	0.83			
BC	16.11	2.80	.386**	.635**	0.65		
BI	15.98	3.12	.418**	.620**	.596**	0.72	
AA	19.58	5.52	.220**	.127*	.278**	.188**	0.83

* Correlation is significant at the 0.05 level; ** Correlation is significant at the 0.01 level (2-tailed).

Diagonal elements are AVE. Off-diagonal elements are correlations between factors.

Table 3. Results of hypotheses testing

Path	Model1 β(t)	Model2 β(t)	Model3 β(t)	Model4 β(t)	Model5 β(t)	Model6 β(t)
AT-BI	.39(7.93)	.10(3.27)	.11(2.36)	.09(1.89)	.10(1.98)	.10(2.00)
SN-BI		.64(11.41)	.36(5.61)	.35(5.23)	.35(5.32)	.34(5.17)
BC-BI			.37(5.50)	.38(5.61)	.38(5.56)	.39(5.70)
AA*AT				-.08(-1.87)	-.10(-2.19)	-.12(-2.44)
AA*SN					.05(1.12)	.01(.12)
AA*BC						.10(2.11)
χ^2	69.12	146.92	207.64	226.63	242.16	262.54
df	23	48	81	92	103	114
GFI	.96	.94	.93	.93	.93	.93
AGFI	.92	.90	.90	.90	.90	.90
CFI	.98	.98	.97	.97	.97	.97
RMSEA	.071	.072	.063	.061	.058	.057
R^2	.189	.476	.547	.553	.555	.562

Note: Standardized β is significant while t-values exceed 1.96.

advantages and importance of agritourism planning (Wang and Ritchie, 2012). Specifically, alternative attractiveness can moderate the relationship between attitude and intention, and perceived behavioral control and intention indicating that tourists might have lower probabilities to stay while viable alternatives are met. The features and the image of the farms should be promoted first to defend viable alternatives.

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APPLYING THE FUZZY THEORY AND THE KISS CONCEPT TO FURNITURE DESIGN - THE CASE OF THE ENJOY CHAIR

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Abstract

In this study, the fuzzy theory and the Kiss Concept were applied to furniture design, and Enjoy Chair was employed to investigate consumers' satisfaction. To make furniture more convenient and easier to use, the Kiss Concept was introduced to design ergonomic size of furniture. In addition, the traditional Ming-dynasty furniture style was also added to the design of Enjoy Chair. In this study, the fuzzy theory was applied, and it was found that consumers attached the greatest importance to the seat width of Enjoy Chair, and it is necessary to simultaneously consider both seat width and seat height when a chair is designed in order to conform to users' demand and satisfy them.

Key words: fuzzy theory, Kiss Concept, Enjoy Chair, consumers' satisfaction

Introduction

New information technological products have been produced nowadays, and human beings, their living styles, and their living environment have rapidly changed. Therefore, when a product is developed, it is necessary to consider the impact on the environment and the design for environment (DfE) (Shiu and Huang, 2005). In that case, design should be based on sustainable management, which is also the purpose of this design. From a sustainable perspective, the fuzzy theory was applied to the furniture design, and then the product was transferred by means of KISS to integrate the concept that simplicity is beauty into the product and furniture design, and, meanwhile, the concept that less is more was applied to the design of Enjoy Chair in order to meet consumers' demand and enhance their satisfaction.

Literature Review

Fuzzy Theory

The fuzzy theory is an important concept brought up by L.A. Zadeh (1965), a professor emeritus at the University of California, Berkeley for expressing the fuzziness of objects and matters. Covering an extensive range, the theory was developed basically for dealing with fuzzy concepts. The idea of membership was thus brought up to limit the relation between elements and

sets to the range between 0 and 1 and make the descriptions of actual phenomena mathematical. The fuzzy theory is similar to the human thinking model of problem solving. When people make decisions, lots of expressions of subjective consciousness are usually fuzzy, so it is difficult to have specific boundaries, and the fuzzy set theory is the optimal method for dealing with this type of problems (Lin, 2001). By the concept of fuzziness, some design concepts were derived, respectively "fuzziness in use," "fuzziness in materials," and "fuzziness in use occasions." First, the use of products for people is fuzzy and multi-dimensional. A product can be not only a product. For example, Enjoy Chair can be not only a chair but also a short table. It can also be another piece of furniture after combination. In this study, the fuzzy concept was applied to the design of Enjoy Chair, and, meanwhile, the users' satisfaction for the size and use of Enjoy Chair was investigated.

Keep it simple and sweet (KISS)

"Keep it simple and sweet" is a design principle, that is, simple and silly design. Generally, there are three viewpoints for this principle. First, KISS stands for "Keep it simple and stupid." Some people say KISS is "Keep it simple and sweet" (Li and Ke, 2009). Hence, KISS was integrated with the design of Enjoy Chair.

As for product semantics, Lin (2000) mentioned that the reason for consumers to buy or use a product lies in not only the function but also the meaning that it represents. In terms of product shape, everyone's perception of the same object is different due to the personal subjective consciousness, perception, imagination, and emotion. Therefore, the fuzzy theory, the KISS concept, and product semantics were applied to the design of Enjoy Chair.

Application of the Design Theme and Concept

Dovetail joints were applied to the design of Enjoy Chair. The structure can resist tension and thrust, so it is suitable for bonding solid wood boards together. This is one of the strongest wood bonding methods in carpentry since it resists tension and thrust from all directions except the direction of insertion. The design flowchart of this study is shown in Figure 1.
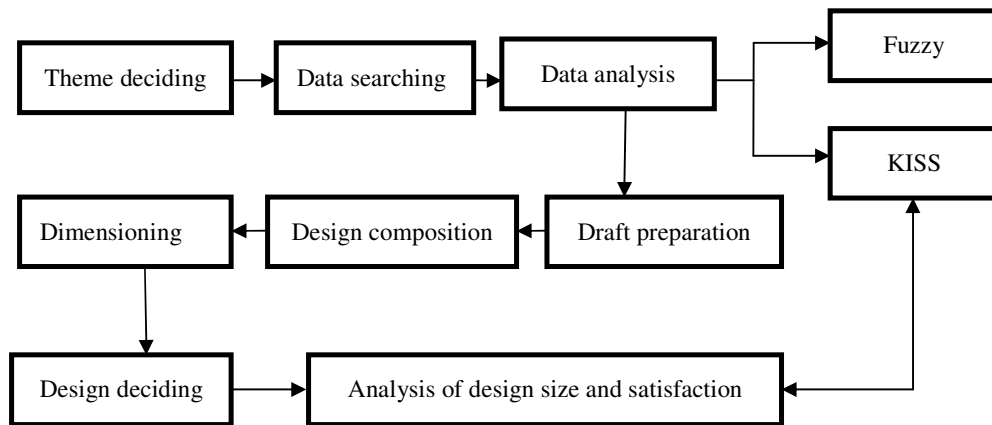
Design Theme and Process

Figure 1. Design flowchart

Design Concept

Enjoy Chair was used as the example in this study. It is a piece of multi-functional KD furniture suitable for living rooms:

Design Concept: Dovetail joints which are common in traditional furniture were mainly applied to the shaping, and furniture from Ming and Qing Dynasties were also referred for partial shape adjustment. The major design concepts included the KISS concept

and the fuzzy theory, in which the fuzzy theory was the main concept
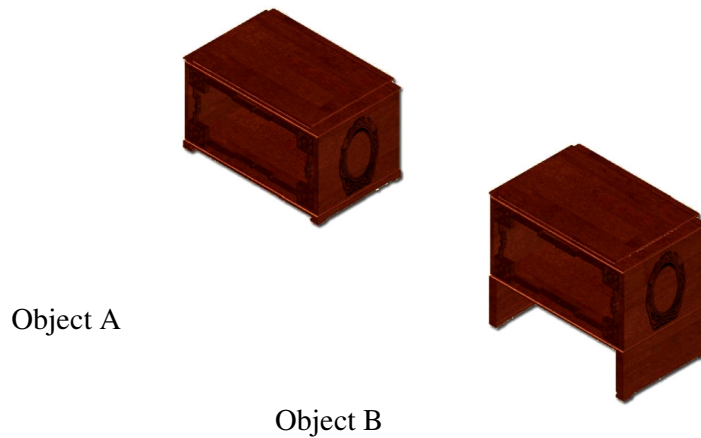

Object A

Object B

Figure 2. The structure of Enjoy Chair (Object A and Object B)

Figure 3. Enjoy Chair assembly illustration

while the KISS concept was minor concept. The range was covered by general design. Furthermore, it was hoped that users' satisfaction will be increased by the method of use. Design Feature: the shape came from a dovetail joint tenon, which is also used as a detachable component of KD furniture, that is, the dovetail joint can be used for assembly and disassembly. Before assembly, Enjoy Chairs are respectively tables and chairs, but after assembly, they become cabinets or bookcases.

Method of Use: Each individual object which can form a whole has both a dovetail joint mortise and a dovetail joint tenon, so it can be assembled, namely being drawn out or pulled.

As shown by Figures 2 and 3, the overall shape of an Enjoy Chair combines a dovetail joint with a Ming- and Qing-style canopy bed. The dovetail joint tenon is regarded as the desktop. The layered feeling of the girdle under the desktop is carved, and it is the same in the bottom. Moreover, deformed 卍 patterns and deformed bat patterns are connected to decorate the door covers for indicating absolute good fortune, and finally carving is applied to the ending. An Enjoy Chair includes Objects A and B. Object A is on the left while Object B is on the right. They are combined by a dovetail joint. Several objects can be piled up in order to save space, achieve diversity, and increase consumers' satisfaction.

Design Explanation and Problem Solving

Objects A and B can be short tables or stools. After being assembled, they become a cabinet type of furniture. This is "fuzziness in use" in the fuzzy theory. However, the material is unnecessarily wooden although the structure is an imitation of wooden structure. This is so-called "fuzziness in materials." In addi-

tion, the shape of the chair is consisted of simple geometric shapes, the chair can be used for storage, and it is easy to use the chair, so the design of the chair is the optimal design achievement of the KISS concept.

As human population skyrockets unceasingly, human beings face a space crisis, so a great number of designs are aimed to save space. Nevertheless, the design in this study was conducted from another perspective, namely efficiently using space instead of saving space. When Enjoy Chairs are not used as short tables or stools, they can be piled up for better space usage (Figure 4). Furthermore, the traditional Ming-dynasty furniture style is applied to the detailed design of Enjoy Chair, as shown in Figures 5, 6, and 7.

Figure 4. The sliding illustration of Enjoy Chair

Figure 5. Enjoy Chair- then angle close-up of Object A

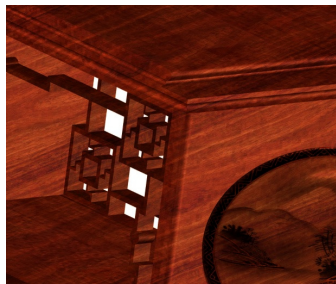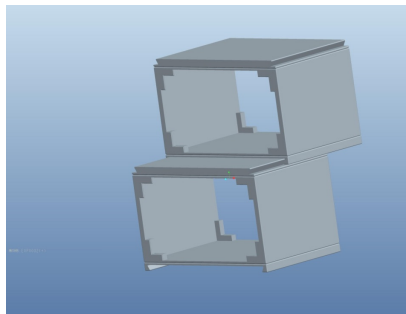Figure 6. Enjoy Chair – the bottom carving close-up of Object A

Figure 7. Enjoy Chair – the top close-up of Object A

Dimensions Design and User

Liao (2001) addressed that furniture design should be people-oriented, and the functions and shapes of furniture should be based on human body dimensions. In this study, the seat width and seat depth of Enjoy Chair were investigated in order to understand the comfort of usage for users. The dimensions adopted in this study are listed in Table 1. Moreover, the design in this study was established by referring to the research of Grandjean et al. (1973) on chair comfort evaluation, as shown by Table 1.

The fuzzy analysis of users' satisfaction for Enjoy Chair

Table 2 shows the fuzzy means of users' satisfaction for the seat width, seat depth, and seat height of Enjoy Chair. The design of seat width had the most significant influence on consumers' satisfaction whereas the design of seat depth had the least influence on consumers' satisfaction. Therefore, consumers attach the most importance to the design of seat width.

Table 1. The external dimension design principles of Enjoy Chair

	Enjoy Chair Dimensions (cm)	Explanation	Remark
External Length (Seat Width)	57	It should not be less than 15.7in (40cm).	The 95th percentile two-elbow width was applied to the joint chair. The value is approximately 19~20in (48~51cm).
External Width(Seat Depth)	35	It should not exceed 16.8in (43cm).	Nil
External Height (Seat Height)	35	The 5th percentile knee height was adopted. The values for males and females are respectively 15.4in(39cm) and 14in(36cm).	Nil

Table 2. The fuzzy analysis of consumers' satisfaction for Enjoy Chair
(descriptive statistics)

	N	Minimum	Maximum	Mean	Std. Deviation
Seat Width	100	1.00	3.00	1.9000	.70353
Seat Depth	100	1.00	2.00	1.3000	.46057
Seat Height	100	1.00	3.00	1.6000	.66667
Valid N (list-wise)	100				

Table 3. The fuzzy analysis of consumers' satisfaction for Enjoy Chair (correlations)

		Seat Width	Seat Depth	Seat Height
Seat Width	Pearson Correlation	1	.405(**)	.775(**)
	Sig. (2-tailed)	.	.000	.000
	Sum of Squares and Cross-products	49.000	13.000	36.000
	Covariance	.495	.131	.364
	N	100	100	100
Seat Depth	Pearson Correlation	.405(**)	1	.395(**)
	Sig. (2-tailed)	.000	.	.000
	Sum of Squares and Cross-products	13.000	21.000	12.000
	Covariance	.131	.212	.121
	N	100	100	100
Seat Height	Pearson Correlation	.775(**)	.395(**)	1
	Sig. (2-tailed)	.000	.000	.
	Sum of Squares and Cross-products	36.000	12.000	44.000
	Covariance	.364	.121	.444
	N	100	100	100

According to Table 3, the fuzzy values of consumers' satisfaction for the seat width, seat depth, and seat height of Enjoy Chair were significantly correlated. Among the results, the seat width and seat height were the most significantly correlated (r(100)= .775,p<.00) while the seat height and seat depth were the least correlated (r(100)= .395, p<.00). It is thus known from the aforementioned results that when Enjoy Chair was designed, the seat width and seat height should be simultaneously considered in order to conform to consumers' demand and satisfy them.

Conclusions and Suggestions

To respond to the concepts of eco-friendly design and sustainable development promoted in recent years, the fuzzy theory was adopted in this design, and fuzziness was displayed in use in order to allow users to bring into full play their creativity to create their own methods of use, achieve the goal that each piece of furniture does not have only one function, and further incarnate the concepts of sustainable development and environment protection. The method of use stands for easy learning, or even no learning, which tallies with the KISS concept.

In terms of dimensions, although Enjoy Chair is mainly used as a chair, it should also conform to ergonomics. An extensively accepted design principle is that a chair should be low enough for the bottom of the thighs of a person who sits on the chair to avoid excessive pressure. Common practice is to adopt the 5th percentile knee height. The values for males and females are respectively 39 cm and 36 cm (Hsu, Peng, and Wu, 2010). For all-purpose use, Enjoy Chair was designed to be approximately 35 cm high.

Although the use possibilities of joint chairs were considered, there was still a medium sardine effect, so the seat width of Enjoy Chair was slightly enlarged. It was also found in this study that users would like to use several Enjoy Chairs by jointing them, and the seat of Enjoy Chair made users associate the chairs with a storage function.

In this study, it was found that (a) consumers attached the greatest importance to the design of seat width; (b) when Enjoy Chair was designed, the seat width and seat height should be simultaneously considered in order to conform to consumers' demand and satisfy them. Consequently, when designers design chairs similar to Enjoy Chair, they should focus on the seat width, simultaneously consider the seat width and seat height, and regard ergonomic design as the priority in order to satisfy consumers' demand and increase their satisfaction.

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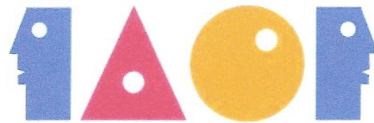
EVALUATION ON BENEFITS AND DEVELOPMENT OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) TO IMPROVE THE PERFORMANCE OF AGRICULTURAL EXTENSION IN CENTRAL JAVA

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Abstract

Recently, the policy of local government tends to be less supportive to agricultural counseling program. This leads to the decrease of agricultural extension performance. This research aims to (1) analyze the use of information and communication technology by agricultural extension institutions in Central Java, (2) formulate system of information and communication technology (ICT), and (3) conduct a trial application on information technology in research areas. This research was conducted in Klaten, Magelang and Grobogan regencies.

The study focused on productions, prices, soybean markets, distribution channels for rice & vegetables, number of farmers, programs of Agricultural Department and the existing information technology. This research used mixed method- quantitative and qualitative approach. The data were collected by conducting observations, interviews, FGD and distributing questionnaires. The result found that the offered model in case of institutional capacity development has supported agribusiness performance. ICT model that offered could essentially solve information problems, communication barriers between agricultural extension and stakeholders with farmers as well as society, traders and government institutions. Besides, government needs to implement one village one extension to improve agribusiness performance. The result of the research confirmed that it is essential in this technolgy development area to

implement institutional capacity model by employing ICT technology for agricultural extension for a better agricultural performance.

Key Words: Institutional Agricultural Extension, Polyvalent, ICT, Mixed-Method, Central Java, Indonesia

Introduction

Several studies in developing countries reported that information of the results of the research were not accessable by farmers, including in Indonesia (Basuki et al, 2000; Sulaiman, 2002). Furthermore, recent technology which was created by public research institute was not well-implemented by farmers (Agency for research and agricultural development, 2004). These are driven due to some reasons. First, the technology is not based on the condition of social, economy and culture of the farmers. Second, the created technology does not meet the current need of the farmers. Third, in fact, there is less awareness to conduct research focusing on innovation to improve value added which is later useful for society. Fourth, the absence of support required to adopt technology such as budget for infra-structure provision (Sulaiman, 2002). Last but not least, not only the tech-nology use dissemination is found to be ineffective, but also the process of technology shifting recommended by research institute to the end user; the communication among extension and stakeholder with the farmers and other agribusiness parties (Syam, 1992; Basuki et al, 2000; Sulaiman, 2002).

To improve the performance of agricultural extensions as a part of delivery system and change agent in delivering information, there is a need to conduct a comprehensive study on ex-tensions in getting benefit from tech-nology. This will help extensions to easily conduct communication with the farmers. Therefore, the objectives of this study are:

- To study information and communication technology utilization by agricultural extension in Central Java.
- To formulate information and communication technology system.
- To test the application of information technology in sampled area.

Recently, in the era of information and communication technology, conventional information system has been no longer able to accommodate huge changes happening in telecommunication sector (Hubies, 2000). Derr (1983) stated that the need of information is the relation between information and its goals for someone. This means there is one particular goal which needs certain information to achieve. Hence, mastering information and communication technology (ICT) is undeniably acquired to deliver information from agricultural extension to farmers.

ICT is a technology which relates to gaining, saving, processing, and distributing information by making use of computer and telecommunication technology (Amri et al, 2008). He added that ICT is a technology which is used in data processing. It is also helpful for the provision of information. ICT is any kind of technology and resource to create, spread, save, add value and manage information process. Maria (2000) stated that ICT is the combination of equipment from various applications that is used to produce, distribute, proceed, and make information transformation.

ICT is regarded as one of the strategies to decrease poverty especially in rural area (Derr: 1983). He found that ICT could bring changes for farmers. These include in providing access and assistance for farmers to be more competitive by having easy access to information. It is considered as one of the effective ways to distribute information to farmers. According to Rahim (2008), it is preferable to agricultural extensions in acquiring skills in using ICT to make their job easier. For instance, they could use the latest technology through internet, hand phone, pamphlet, brochure, etc.

According to Maria (2000), ICT is a any kind of communication media either written, verbal, or picture. Recently, the information technology has fastly developed in which making the information exchange in society easier to do. People are also familiar with internet and cellular phone which are popular in communication media. Both instruments are truly helpful for the exchange of the information even in long-distance communication.

Through internet, various types of information from all over the globe could be easily accessed for 24 hours. In fact, the absence of internet access in some places has become barrier in getting information from internet. Hence, the information service through hand phone could be the best solution to overcome such problem. Moreover, various applications in mobile service have rapidly developed which enabling users to do more errands.

Methodology

ICT utilization in agricultural counseling used mixed method -quantitative and qualitative (Creswell, 2007). The term mix method is the concept of using two methods in a research. In this study, I used the quan-titative approach as the

primary method which is later completed by qualitative. This aimed to answer the question of utilization of ICT by agricultural extension and calculation of transaction cost estimation in setting up ICT system in research area. Besides, the quantitative approach is meant to figure out the agricultural performance and the extensions. This has been conducted by previous research (Sucihatiningsih, 2010). The result of the earlier research was to set up the agricultural extension institution in the area. This research is the follow up of the previous study.

For the sake of a comprehensive result, the qualitative method was employed to give deeper analysis. The use of qualitative method is related to the need in answering the question on agricultural extension characteristic and counseling target both socially or culturally, and the relation between farmers and agricultural extension. Besides, it is also useful to elaborate the ICT institutional system model.

I took agriculture extension in some leading commodity production centers in Central Java including bean production center in Grobogan, rice production in Klaten, and vegetable in Magelang. Sample model of bean commodity was selected by multiple stage sampling. This means that the sample is taken from one population community. However, only a few of the population member become the sample for the research (Creswell, 2007).

The sample of quantitative approach included farmers, and the extensions (Sucihatiningsih, 2010). The research areas were selected because of several reasons. First, these three areas were the competitive places. Grobogan regency was well-known by its bean commodity. Klaten was known as the paddy producers, and Magelang was famous with its vegetable commodity. Second, the

selected areas were the result of the discussion and consultation with related government institution.

Primary and secondary data were used in this research. The primary data was gathered through interview and observation. The interview was conducted by having in-depth interview and Focus Group Discussion (FGD). Meanwhile, in-depth interview was employed for farmers, agricultural extensions, and informants including public figure, local government, agriculture department, Board of Technology and Agricultural Extension (BPTP), House of representative, and the related agricultural parties.

Then, the FGD was executed by first having brainstorming and dialogue with related agricultural people from academics (A), business (B), government (G), and civil society (C). The FGD was used to seek for factual data from non-respondents farmers and the head of the leaders of farmers group. This FGD is expected to figure out the solution of existing problems for farmers and extensions to improve the farmers performance in each region. Observation was done to gather actual and updated information upon the existing phenomena such as the extensions' performance, and their daily relation with the farmers.

Secondary data was the documents such as previous research (Sucihatiningsih, 2010) related to the capacity building of the extension institution. The previous study on agricultural extension performance, agriculture characteristics, extensions, and cultural and social situation in the areas become the fundamental reasons for having the idea of the ICT benefit.

Results and Discussion

Institutional agricultural extensions need to anticipate challenges posssibly happen to some programs. They might see the barriers on social and cultural aspects. Previous study conducted by Sucihatiningsih (2010) mentioned that the implementation of technology meet the barriers in relation to social and cultural aspects.

Thus, agricultural extension institution needs to be more aware in applying the programs in particular community. It is important to understand that agriculture economy is an economic-based family, which means that the economy organization is done together by family members. Father and mother have their own roles as well as the children. Practically, they help each other at times. Hence, whenever there is information through short messages in mobile phone, the other members of family can help each other in receiving and understanding the information if any technical problem happens (Syahyuti, 2002, 2003).

Farmer has an important role in the activity to implement information technology (IT). It is expected that the information technology would help them in improving their economic condition. Farmers will be accompanied by some interest parties including sellers, entrepreneurs, agricultural extension, government and community. They have their own roles and it is related to each other. By the existence of information technology, it is expected that farmers are able to access information as acquired for agribusiness activities (Rogers, 1995). For instance, the sellers and entrepreneurs, either within or outside the cities, are able to access current price. This facility is very important for farmers in order to speculate crops sale. Besides, the farmers will have more valid

information from agricultural extensions or Agricultural Department.

Practically, IT will ease agricultural extension to distribute information including information related to existing problems faced by farmers. Besides, through farmer community as messengers to the agricultural extension, they will be reconcilable in one place to solve their problems. It is called research centers. This research center is the platform for farmers to discuss their problems and seek for solutions. Thus, research center is very beneficial because it could also be used as reference for Agricultural Department in giving supporting policy for farmers such as policy in case of facility or other policies. Based on field research, it was found that most farmers are capable in getting information through hand phone (HP). Thus, IT system is expected to be well implemented in order to increase farmers' productivity and performance. The explanation related to the implementative model is as in figure 1.

IT Modeling through Web, WAP, and SMS

In the communication media, Short Message Service (SMS) and Wireless Application Protocol (WAP) are the examples of mobile applications that support information exchange. SMS is the service to send and receive short messages through mobile phone. This service is very popular because it relatively has low cost. on the other side, WAP is a protocol which connects internet to mobile phone. By applying this technology, mobile phone could be used to gain information from internet.

Several reasons of choosing website, WAP, and SMS media are to:

- Save money and time in socialization process. Agricultural extensions and stakeholders will spend less cost for policy socialization, updated information, etc. Information access could be executed every time, everywhere, and by everyone.

- Minimize the red tape in bureaucracy and economy chain. By providing database access, the data could be accessed and it is communicated to the target group. The chance in getting more customers also becomes bigger. That means, there is more opportunity for farmers to establish network either local, national, or global market.

- Synergize all agricultural stakeholders in an organized platform. This platform will enable every element of the agricultural institution to functions better and be more professional.

- Update market information. By the increase number of internet user, there is an opportunity to advertize, and distribute goods through internet. It is also helpful for costumers to enable them buying products directly irrespective of distance.

- Ease communication. This easiness and less cost in communication process will be beneficial for all related stakeholders. Information of new products could easily be sent to the customers through SMS, WAP service, or email from website. Stakeholders are able to choose information service that meets their needs either by phone or by internet. Through website, business information message could be delivered completely and easily.

Interaction media

Website can be used as media for interaction among website visitors such as trading, discussion forum, file upload or download, etc. Therefore, the function of the website in this case is not only as a place to provide information, but also to gather various information. Hence, there is a need to create a system to make the communication and information on agriculture and commondiy work well. This online access is not limited by time and place. SMS, WAP, and Web are kinds of application which can be used as information service to meet the needs.

Context Diagram

As there are many stakeholders related to this ICT system, it will be useful for each institution to easily access and update the information they have. The involved stakeholders are Agricultural Department, Board of Extension Coordination, Regional Agricultural Department, and other related institutions. They would be given an authority as administrators that can input all existing data to meet the need of the farmers as illustrated in Table 1.

Conclusion

Based on the above discussion, ICT model could essentially solve information problems, communication barriers between farmer, society, trader and government institution. By the service that adaptable to the needs of costumer, information through SMS could be accessed by every layer of society. It also provides fast service and up-to-date information. SMS service is very effective because its simplicity and can be used everywhere especially in agriculture locations, markets, and other places. Cellular phone with WAP service with some particular features will give complete data accessible for internet users by online. Web service provides complete and various data for agriculture department officers, government, research center, academician, reporter, or any other related parties. Agriculture extension as government agent will be able to review and analyze the data which enable them to give accurate information to farmers.

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Table 1. Input – Process and Input Track

No.	Input track	Process	Output track
1	Governmental stake-holders	Database	Primary and secondary data
2	Technology data/information	Database data	SMS/WAP/Web Data
3	Other institution/academician	Process data	Publication/ Data Analysis
4	Requested data	Process data	Info Data

Appendix A.

Parties who are involved in IT system proposed:
a. Agricultural Department . It functions as technical department for agriculture and food security
b. Agricultural Extension/Extension Coordination Board (Bakorluh) as the supplier and user of agricultural information and data analysis which are used for counseling and responding to technical question.
c. Farmer is the main actor of agriculture.
d. Trader/entrepreneur functions to manage agricultural production crops and distribute the products to the market
e. Academician functions as researcher, assessor, and developer of new technology in agricultural field based on their own specialization and interest
f. Research and Development Board (Balai Litbang) of Agriculture has role as the institution that develops certain field, and assess the application of technology that can be used in agricultural field including someone that is responsible for certain topic and be public informant.
g. Industrial and Trade Department (Deperindag) has role as technical department in supervising industrial activity, trading, and distribution of national foods
h. Regional Agricultural Department functions as coach, supervisor, and policy maker of local agriculture institution
i. Non-governmenal Organzation or other public institution such as private institutions, college students, students, reporters, or other institutions that are able to interact with people related to agricultural activities including in making particular analysis and observation. They behave also as observers and agricultural supervisors including policy, trade system or field-operational actors.
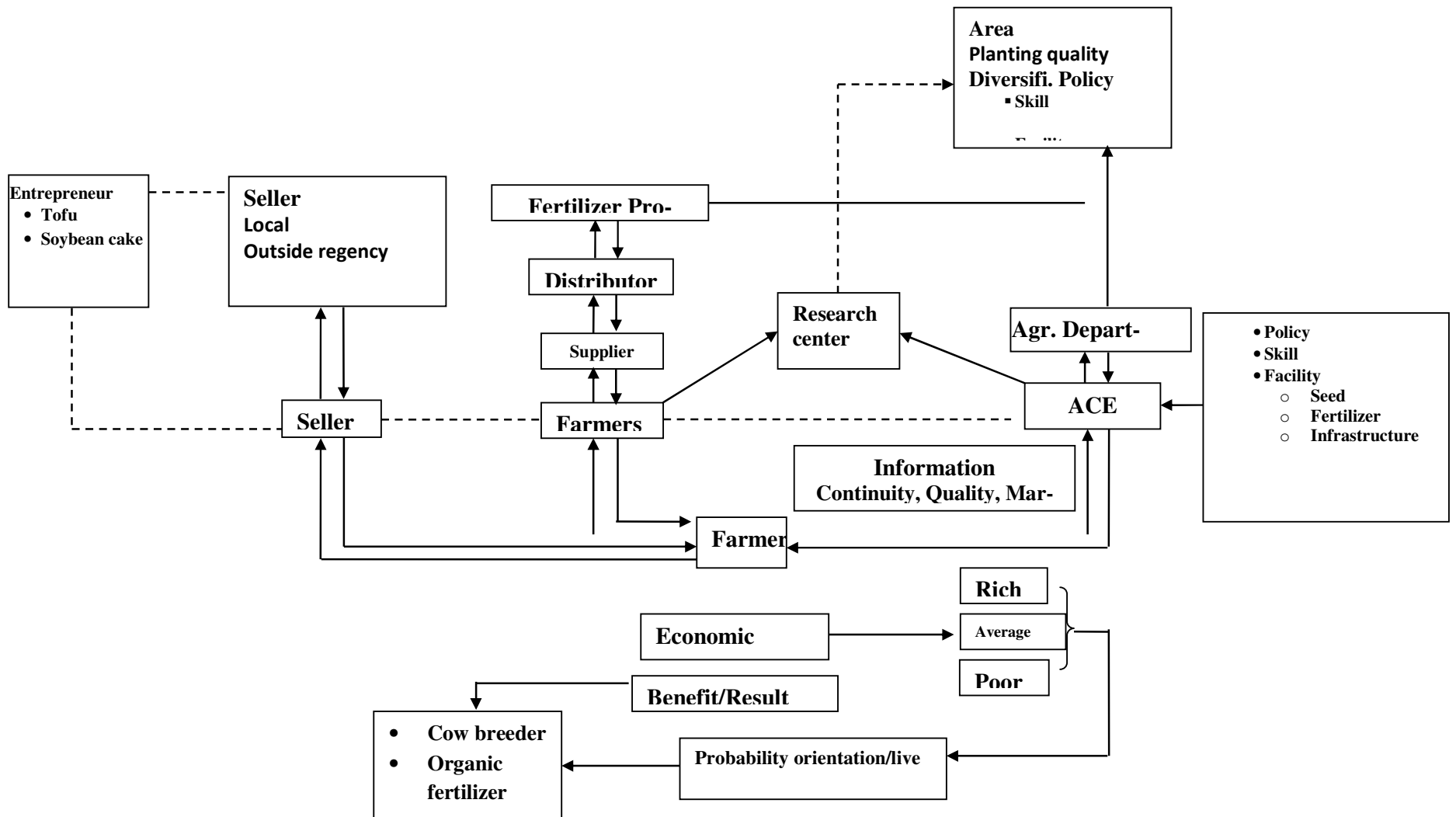
Figure1. Increase Farmers' Productivity and Performance

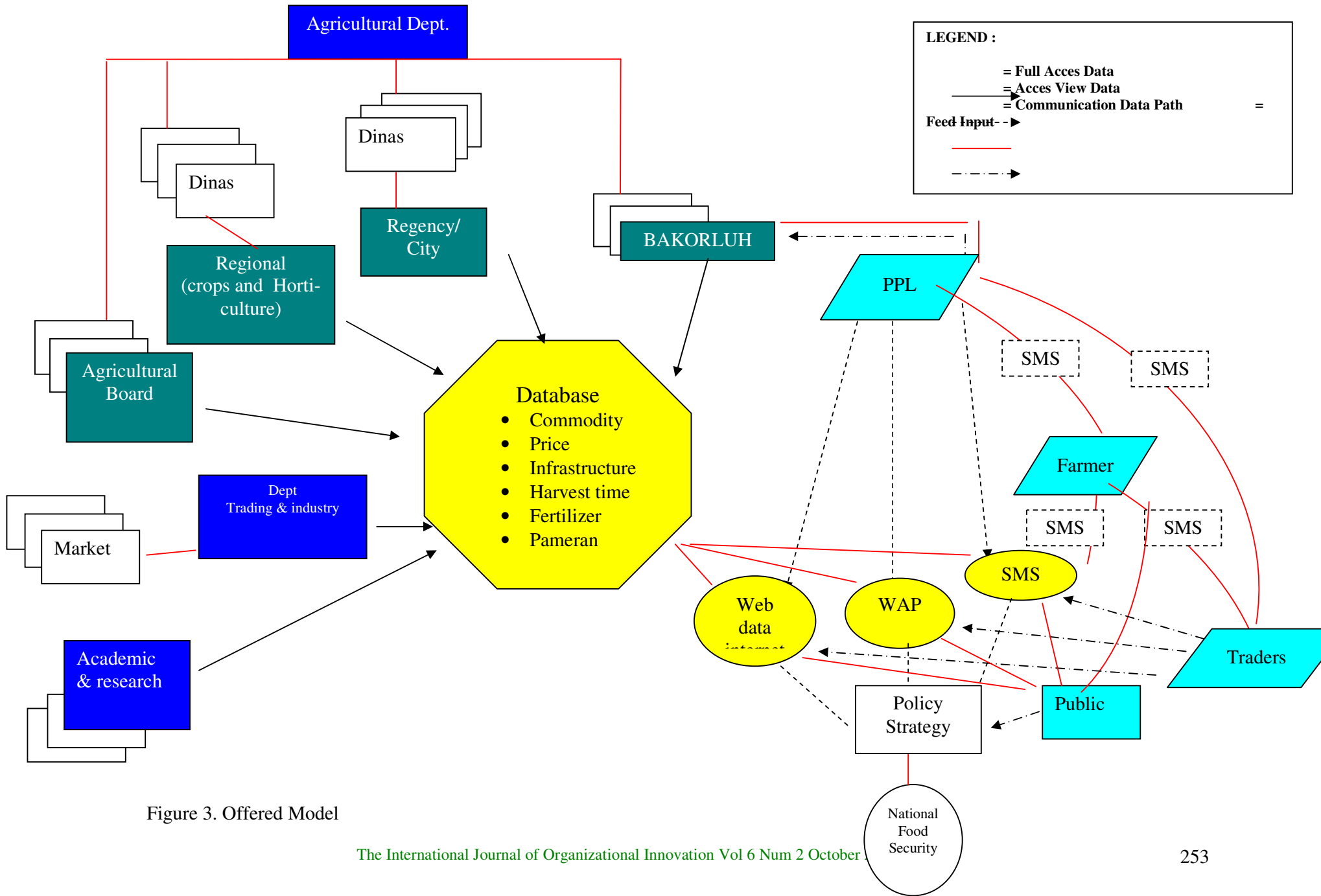Figure 2. Agricultural Information System Context Diagram

Figure 3. Offered Model

Agricultural Dept.

Dinas

Dinas

Regency/City

BAKORLUH

PPL

Regional (crops and Horti-culture)

Agricultural Board

Market

Dept Trading & industry

Academic & research

Database
- Commodity
- Price
- Infrastructure
- Harvest time
- Fertilizer
- Pameran

SMS

SMS

Farmer

SMS

SMS

SMS

Web data internet

WAP

Traders

Policy Strategy

Public

National Food Security

LEGEND :

= Full Acces Data
= Acces View Data
= Communication Data Path   =
Feed Input