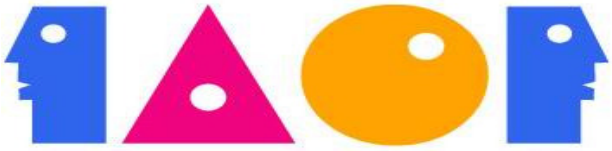

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Table of Contents

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INFORMATION REGARDING

THE INTERNATIONAL JOURNAL OF ORGANIZATIONAL INNOVATION

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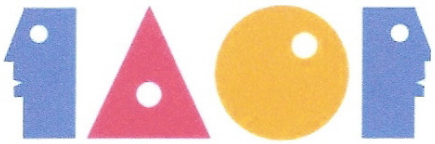

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International Journal of Organizational Innovation

A PROPOSED FRAME OF REFERENCE FOR COMPLEXITY MANAGEMENT AS OPPOSED TO THE ESTABLISHED LINEAR MANAGEMENT STRATEGIES

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Abstract

Background: As our world becomes more global and competitive yet less predictable, competitive advantage and strategic management becomes more dependent upon non-linear models and designs based on complexity and complex adaptive systems. There is no ignoring the impact of world crises like the global financial crises, natural disasters around the globe, use of cheap labor in developing economies, growing lack of natural resources, the impact of the industrial revolution and information age, developing and transient economies changing market and industry dynamics. Competitive strategy increasingly depends upon successfully managing strategies and management models that are contradictory to existing linear strategies. Existing management philosophies and models are built on principles of stability and equilibrium in a machine-like, well-behaved universe. In business, this leads to questioning the validity of existing models and acknowledging the disruptive nature of ubiquitous business enablers and the consequent turning towards complexity

Objectives: This paper justifies the reason for non-linearity and the resultant application of complexity-based modeling rather than the traditional management and design models available in strategic management and searches for the elements of non-linear solutions. These elements subsequently provide some framework for addressing strategic management as a complex construct. The objective of the paper is to present evidence that conflict with the current management thinking and to initiate a base for non-linear designs and models over the existing ones in use over the past hundred years or so.

Method: The article uses a grounded theory approach to investigate different elements for strategic management in a complex domain. The focus is not on the leadership actions but on the management models itself – those cemented in the past and a growing sense that interrelationships and instability require a new generation of models, possibly embedded in complexity science.

Results: Three possibilities are suggested in the complexity domain, one based on complex adaptive systems, the second on strategic agility and resilience; and the last on strategic paradoxes or contradictions.

Conclusion: This article justifies the need for non-linear management strategies and then continues to identify and describes three possible ways of dealing with complexity management as opposed to established linear management strategies. Three possibilities are suggested in the complexity domain, one based on complex adaptive systems, the second on strategic agility and resilience; and the last on strategic paradoxes or contradictions.

Key words: Complex adaptive systems, complex response processes, complexity in management, resilience, chaos theory, paradoxical management, innovation.

Introduction

'That when a thing lies still, unless somewhat else stir it, it will lie still forever, is a truth that no man doubts of. But that when a thing is in motion, it will eternally be in motion, unless somewhat else stay it, though the reason be the same (namely, that nothing can change itself), is not so easily assented to. For men measure, not only other men, but all other things, by themselves; and because they find themselves subject after motion to pain and lassitude, think everything else grows weary of motion and seeks repose of its own accord, little considering whether it be not some other motion wherein that desire of rest they find in themselves consisteth.'.
Thomas Hobbes in Leviathan (1651)

Business as Unusual

Thomas Hobbes saw society as a giant machine (perpetually in motion), thus the title of his great work, The Leviathan, founded on Mechanics (The Motion of Bodies/Matter). In Leviathan, Hobbes argues that the natural state of man (without any civil government) is war. Hobbes supports an absolute monarchy, where power resides in the king or queen, as this absolute power to create and enforce laws was necessary for justice and the formation of a moral society. Hobbes was close to the truth in two ways: (1) Reality exists as an interconnected 'machine and (2) motion is fundamental to reality (that means, it is real, not metaphorical).

Societal concerns (for instance, fear of nuclear events, natural disasters, the thinning of the ozone layer and provision of food and water) are exacerbated for businesses by added pressures like downsizing, restructuring and the chaotic nature of the markets. More than that, the last two decades have seen rapid growth in technological developments. There is pressure from global competitors in a once secure domestic market. This is underscored by new commercial arrangements, where diverging economies fuse to create one world economy consisting of multiple markets. The focus on trade has migrated from the Atlantic to the Pacific. Fluctuating world political and financial systems cause a questioning of values. The arrival of the Internet, the fall of the Berlin wall and the lifting of the Bamboo curtain pushed management into a world of real-time communication accessible to all levels of society. All

of these are exacerbated by, and resulted in, changing the management paradigms and strategies as we know them. Business and management are becoming too complex for existing management models and strategies. Linear management designs can no longer handle emerging complexities; the only solution seems to be to replace these by notions of discontinuous thinking.

The modern world has been inundated by catastrophic events that change the business and social environment and broke society's confidence in stability. Examples are (1) the global financial crises creating a growth vacuum and consequently filled with more regulation; (2) natural disasters around the globe and the resultant impact on global businesses because of interrelationships built into global supply chains, multinationals, use of cheap labor in developing economies, etc.; (3) growing lack of natural resources that will impact on manufacturing, service delivery and leads to lopsided supply and demand systems; (4) the industrial revolution creating substantial waste that a service/information economy cannot deal with; (5) the knowledge economy lacking a focus on the elements of linear economics (i.e. land, labor and capital) and (6) developing and transient economies taking over the production that used to belong to developed economies and not abiding by the existing rules of trade and economics.

Smith, Binns and Tushman (2010) are among authors stressing that competitive strategy may increasingly depend upon successfully managing paradox, i.e. strategies and

management models that are contradictory yet integrated. Traditionally, organizational success depends upon taking an 'either/or/ approach to choosing between paradoxical outcomes or possibilities: The external environment is assessed, and decision is made about the business model to implement this single, focused strategy. Success then depends upon the alignment of (1) the model's internal aspects and (2) its link with the external environment (Smith *et al.* 2010). A complex theory possibly provides the only platform for stability in an otherwise unruly and dynamic world. The paper shows how these are already part of our society and our lives. Moreover, there is a growing concern that the existing management philosophies and models are built on principles of stability and equilibrium – neither of these being prevalent in the twenty-first century world of work. Complexity principles could replace the mechanistic ones from the Industrial Era that were based on Newton's machine-like, well-behaved universe. Specifically then, within a business context, one should question the validity of existing models and realize the disruptive nature of ubiquitous business enablers like technology, information, market changes, structural and product changes and man himself Is there a way forward? Can the management sciences truly handle these? These issues are explored and new business models and designs proposed to deal with the challenges to our existing paradigms.

This paper forms part of a larger study into the use of complexity management in developing economies more than in developed economies because of the inherent instability

of systems in the first mentioned economies. The primary objective of the study is to determine the reasons why accepted business models mostly fail; and to provide a new paradigm for business modeling in a complex environment. This project identifies the role of complexity in organization design, opposes accepted linear approaches and complexity solutions, and proposes a framework for complexity management in strategy adoption and implementation. By the nature of complexity, this kind of organization modeling requires changing to 'softer' people solutions beyond technical ones that can accept the organic nature of the business. The outcome from the project will be a valid and reliable measurement instrument to determine the extent to which complexity should be acknowledged as well as an identification of the most significant factors that need to be addressed. This is valuable from two perspectives. Firstly, it acknowledges the major differences between developed and developing economies with regards to management and business, and, secondly, it identifies the most important factors for business success, whilst acknowledging non-linearity in strategy adoption.

Research Objectives

This paper acknowledges that linear business models are unable to deal with the above and discusses why and how a complex solution is required rather than a linear one. This poses two questions: *What are the determinants for complexity over linearity in a business environment?* And, *what are the elements of complex models in organization*

design? The paper will provide a framework for dealing with complexity in management sciences and provide three applications – in the management and the strategic management domain. It is acknowledged that, in dealing with complexity, one should not endeavor to provide a solution that in itself looks to be linear. The elements of a complex solution are in themselves also complex, even paradoxical, yet interrelated, and can thus all change.

Considerable attention has been given to agent-based models of organic systems (McKelvey 1999). In modeling complex systems, we should note that agent-based models need to avoid adoption of social concepts that assume away many of the phenomena of interest. In fact, McKelvey (1999) argues, if at least some social phenomena, which are typically assumed to arise through rational behaviour, arise instead due to complex dynamics that are little influenced by conscious intent, and then we need to allow for this in the foundation assumptions incorporated into the model design. In artificial intelligence, for instance, attempts to accommodate rational order have involved incorporating simplified rule sets or incorporation into agent design. Agent-based modeling has resulted in some valuable insight but frequently requires extensive simplification, resulting in limiting value of such models in social systems as these are generally designed to model only one aspect and lack generalizability. At their worst, such models can prove misleading if taken to be reliable analogues of real world phenomena. Also, many traditional methods of research adopt linear concepts of causality and therefore fail to attend to or even obscure complex sources of order.

The research design is qualitative as the research focuses on an emergent phenomena, i.e. the emergence of complexity science in the management sciences and on strategic management. Moreover the investigation of the research objectives in an emerging and self-organizing field 'that has no a priori referent in the world at large that is independent of the researcher's reflection and this requires new ways of knowledge creation' (Cutler 2002:1). Lastly, complex systems are networks more than they are hierarchies and thus we can only offer the following ontological premise for this research; theoretical entities do not represent any real entities unless the phenomenon follow the hypotheses in every detail and as epistemological promise that the interpretation of an observation language is determined by the theories which are used to explain and observe and such an interpretation changes as soon as the theories change.

Current Management Designs and Models

The recent world-wide financial crisis highlighted the sensitivity and interrelatedness of businesses. It also hinted at developing economies being more inclined to accept change in crises (even to live in uncertainty and instability) than developed economies because of their inherent capacity to deal with discontinuous change. Developing economies, especially, are more prone to the implementation of non-linear solutions because of the nature of the variables, the changes and interplays between the variables, the significant human focus and the consequent organic nature of the competitiveness. These variables introduce an

unavoidable element of unpredictability/randomness into any science that can be accommodated by a complex solution. Complexity management allows for pattern recognition which requires focusing on competencies, activities, technologies or resources signaling patterns that will have a positive or negative impact on strategy or operations. Simply put, strategy refers to a set of products or services and their means of competing in the marketplace (Smith *et al*. 2010).

Traditionally, any design focuses on three primary activities running sequentially: determination of the requirements, development of a solution and implementation (or building) of the solution (see figure 1). Linear modeling assumes that problems are clear and well-structured from the start; resources to be determined before the start of the project and that there

Figure 1. Traditional design principles as a sequence of discrete tasks

is a rational and predictable sequence of events (Chance 2010). New possibilities are excluded (Simon 1996).

Business as a complex system requires acknowledgement that we cannot control organizations to the degree that a mechanistic perspective will. Moreover, as the system's

environment changes, so does the behaviour of its agents. Thus, the behaviour of the system as a whole can change. Linear strategies and technologies become irrelevant with a shift to patterns and relationships between entities. A typical management system will consist of four activities – plan, act, analyze, measure (and repeat). Over time, this means that the strategy intends to make something work, then make it work properly, then better, then efficiently, then reliably and then cost effectively, and so on (see Figure 2 (a)). Of course, the reality of this model is a lot of doing, a little planning and a lot of fighting fires that are not known at the outset (Figure 2 (b)).

In contrast to traditional design strategies compromising parameter constraints to find a 'trade off' point (through optimization), Altshuller (1996) discovered that, in finding and resolving the contradictions in a system, significant innovative solutions occur. This discovery negated the myth that creativity and innovative thinking cannot be systemized. Altshuller's Theory of Inventive Problem Solving (TRIZ 1996) enhanced by Mann's Systematic Innovation breakthroughs (2009) offer innovation methodologies and tools that can be exploited by management. Their contributions helped break the barriers around out-dated management models by demonstrating how to achieve innovative management designs and models. They are not the only ones. The management sciences have seen an evolution of management tools starting with scientific management of the late 1700s (see Table 1). These techniques had one thing in common; they viewed organizational systems as linear entities

and attempted to explain and implement solutions in linear terms, i.e. more of the same. In this, Hamel and Prahalad enthused 'planning through the rear view mirror' (1994:97). In contrast, Doz and Kosonen (2010:370) state that organizations fail, not because they do something wrong or mediocre, 'but because they keep doing what used to be the right thing for too long, and fall victim to the rigidity of their business model.' They continue to argue that the business models need to be transformed more rapidly, more frequently and more far-reaching than before.

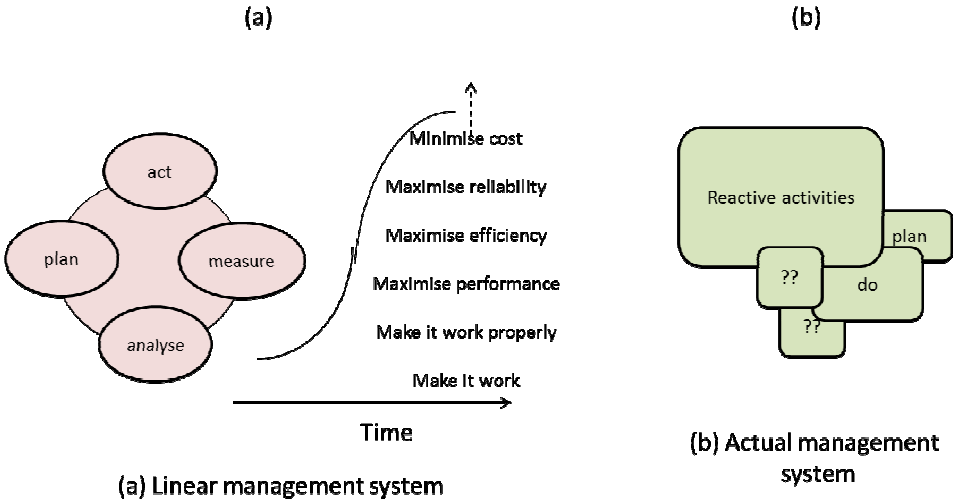

Figure 2. The elements of (a) a theoretical (linear) and
(b) an actual (non-linear) management system

These traditional management models (apart from the last one) need to be replaced by new management tools and skills to create more feasible, beneficial and ethical futures for industry and communities at large. Hamel and Prahalad (1994:211) brought two ideas into the

Table 1. Summary of the evolution of management tools and models

PERIOD	FOCUS	CONTRIBUTORS	ENVIRONMENT
Scientific management (late 1700s to early 1900s)	Specialisation, Functional Approach Work Study Assembly lines Administrative Theory Planning and Control Systems	Smith, Watt, Babbage, Taylor, Fayol, Galbraith, Ford, Sloan	Industrial Revolution World War I Depression Professional Managers
Behavioural Sciences (1940-1960)	Participation, Incentive Schemes, Ergonomics, Hawthorne Studies	Mayo, Barnard, Drucker	World War II Unionisation Reconstruction
Management Science and Systems Engineering (1960-1980)	Operations Research Simulation Modeling System Dynamics Systems Engineering Engineering Logistics, Total Quality Management	Forrester, Deming, Juran, Blanchard	Economic growth Rise of the defence industry Cold War Oil crises High Technology Investments Vietnam War
Operations Management (1980-1990)	Manufacturing Planning and Control Just-in-Time, Business Logistics Productivity Management Lean production	Ishikawa, Taguchi, Shingo, Juran	Competitiveness Rise of Japan Large military spending Economic recession
Business Transformation (1990-2000+)	Strategic Management Business Reengineering Theory of Constraints Benchmarking Information Technology, Organizational Learning	Hammer, Davenport, Martin, Senge, Goldratt, Porter, Prahalad, Hamel	Transformation of various governments New world order New socio-economic problems Dominance of IT sector
[And, more recently]: Complexity (2000+)	Complex adaptive systems (CAS) Non-linearity Collaboration Resilience Innovation	Emerging	Networked environment Pattern seeking Follows questions Technology is intrinsic Business as an organic collective

Source: Pellissier (2011, p. 162).

management sciences: '*Creating a strategic intent that dominates corporate thinking, and then understanding the core competencies [rigidities?] that the organization requires to get*

there. Rather than create numerous 5 year plans, communicate the direction and insure you have the skills to get there.' Hammer and Champy (1990) and Davenport (1993) offered reengineering as the fundamental rethink and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance such as cost, quality service and speed. Of the many problems reengineering faced were: (1) the problem may not have been cost-cutting but growth; (2) there is an over-emphasis on processes not on people; (3) business processes are organic and have personalities because they are made up of people, having different goals, values, needs, etc.; (4) it presupposed a perfect solution by eliminating waste, wherein the 'machine' will comply with the new set of rules; and (5) IT outgrew itself and became much more than an 'enabler' to the reengineering process. The essential rules were to divide a task into several small tasks, to train/practice until an individual task is done to perfection (i.e. specialization), then place all the individual tasks in sequence in the hope that the 'perfect' process has been created. It thus taught how to analyze but not how to integrate and retain a holistic perspective.

Smith, et al. (2010:450) define a business model as 'the design by which an organization converts a given set of strategic choice (about markets, customers, value propositions) into value, and uses a particular organizational architecture (of people, competencies, processes, culture and measurement systems) in order to create and capture this value'. According to Doz and Kosonen (2010:371), business models can be defined in

two ways (1) Objectively, they are sets of structured and interdependent operational relationships between the organization and its customers, suppliers, complementors, partners and other stakeholders, and among its internal units and departments (functions, staff, operating units, etc.). These actual relationships are articulated in procedures or contracts and embedded in (often) tacit action routines. Business models can also function as a subjective representation of these mechanisms, delineating how it believes the organization relates to its environment. (2) Business models function as a subjective representation of these mechanisms, delineating how it believes the organization relates to its environment. Thus, business models stand as cognitive structures providing a theory of how to set organizational boundaries, how to create value and how to organize its internal structure and governance. Both of the above (objective relationships based on contracts and organizing routines and their collective cognitive representation) tend to be naturally stable and hard to change. The latter is further aggravated by the continued strive for efficiency and predictability (especially in periods of rapid growth). Such stability is a prerequisite for efficiency and the traditional management tools and models measure success based on routine repetition of tasks by semi-skilled workers and the convergence-to-fit phenomenon (Doz & Kosonen 2010:371). However, such stability quickly becomes rigidity leading to limited agility and an inability to renewal. Indeed, Ann Livermore, EVP of HP's Technology Solutions Group, emphasized the importance of flexibility of models (in Doz & Kosonen 2008):

'We have an advantage of having multiple models and can hence migrate products between the different business models as products and businesses mature or markets change. For instance, when we take a high-volume supply chain management (SCM) process and apply it to servers, too, the cost and time savings are huge. Developing new business models and related capabilities takes on average six years, and when we can migrate to new business models in months you can understand the difference.'

Current management models seem flawed in dealing with the increasing complexity of modern-day management, and, indeed, add to the complexity of the management system. Below are the most compelling reasons for building and applying complex models:

Taylorism

Existing management theory is embedded in the four primary functions: *planning, organizing, leading* and *controlling*. It presupposes a linear approach where inputs and outputs are related and productivity occurs when outputs are bigger than inputs, in line with Newton's three laws of motion, namely:

1. Every body remains in a state of constant velocity unless acted upon by an external unbalanced force. Thus, a body is either at rest or moving at a constant speed.

2. A body of mass m subject to a net force F undergoes an acceleration a that has the same direction as the force and a magnitude that is directly proportional to the force and inversely proportional to the mass, i.e. F = ma.

3. The mutual forces of action and reaction between two bodies are equal, opposite and collinear. Thus action and the reaction are simultaneous (Pellissier, 2001, p.27).

In 1911, Scientific Management entered the scene with the four principles of Taylor (Fayol 1987), namely: (1) replacing rule-of-thumb work methods with methods based on a scientific study of the different tasks to be done; (2) scientifically selecting, training, and developing each employee rather than passively leaving them to train themselves; (3) providing detailed instruction and supervision of each worker in the performance of that worker's discrete task and (4) dividing work equally between managers and workers, so that the managers apply scientific management principles to planning the work and the workers actually perform the tasks. Taylor insisted that it is only through (1) *enforced* standardization of methods, (2) *enforced* adoption of the best implements and working conditions, and (3) *enforced* co-operation that this faster work can be assured. He felt that the duty of enforcing the adoption of standards and enforcing this cooperation rests with management alone (Fayol 1987). From this definitive management paradigm more 'scientific' control became the norm enabling the mass-production revolution benefiting mainly the new elite (for example black Ford motor cars around 1920).

Technology Change and a New Science

Technology is changing at an unprecedented rate, and we often find ourselves adrift amidst resultant discontinuous change. There is no luxury of anticipating and planning for change, rather, as Stephen Hawking stated, "change is" (as cited in Porter-O'Grady & Malloch 2003:36). Instead of being guided by a set of concrete principles, management in the

twenty-first century must be fluid and adaptable to keep pace with changing conditions (Porter-O'Grady and Malloch). In the twentieth century, organizations focused on finding and performing the right processes, whereas in the twenty-first century, the focus is on delivering the desired outcomes (Porter-O'Grady and Malloch). The process (or work) itself does not guarantee that the intended outcome will be achieved. Our understanding of the future changes on a daily basis, and some would argue that the future is, in fact, unknowable (Stacey, Griffin & Shaw 2000). In twenty- first century organizations, relationships between people inside organizations are the domain and work of management, rather than movement toward some preselected organizational goal or benchmark. In order to thrive amidst the unknown, management must embrace new ways of being and interacting (Hamalainen & Saarinen 2006). These new ways of being, need to be consistent with the change in the nature of our workplaces. That is, management should be such that it assists to end attachments to old structures/roles and create new contexts for work (Porter-O'Grady & Malloch 2003).

Wheatley (1999) laid the groundwork for deeper investigation into the utility of the new sciences as a way of conceptualizing and understanding leadership in the twenty-first century. She focused on (1) order out of chaos; (2) information forming and informing us; (3) relationships that enrich and allow for diversity; and (4) a vision as an invisible field that can enable us to recreate our workplaces and our world. Although her ideas have been viewed by some as more metaphor than science (Stacey *et al.* 2000:143), she made ideas that had

previously been the domain of physicists accessible and compelling to a much wider audience. Wheatley reflected on Weick's (1979) observation on the dilemma organizations face: 'The environment that the organization worries about is put there by the organization' (Weick 1979:122). Axelrod and Cohen (2000) also provided a comprehensive description of complexity as applied to organizations. These authors saw the complexity science approach as having rich possibilities for bridging the gap between 'hard science' and 'humanism' (p. 159). Works such as Axelrod and Cohen, and Wheatley represent a definite move away from the mechanistic twentieth-century paradigm of leadership. However, as we start to move away from old ways of thinking, there seem to be some ideas that are harder to let go of than others.

The Living Present and a Changing Conception of Time

From a transformative point of view, the future is under perpetual construction, rather than predetermined as in rational causality. This means that human interaction that takes place in the living present perpetually modifies and shapes the future. The concept of time plays a central role in understanding organizations as complex responses processes (CRPs) and warrants further discussion. And their interactions with each other in the living present that make up an organization. We can define an organization as a temporary stabilization of themes or habits that serve to organize the experience of being together that takes place locally and in the living present (Fonseca 2002).

CRPs represent a decisive step away from the mechanistic leadership models of the previous century. Stacey et al. (2000) felt that this new terminology *(CRPs)* was needed to differentiate their view of complex; relational human organizations from the more commonly used terminology of complex adaptive systems that leads us to think of human organizations as objectified systems. The theory of CRPs is, in essence, a theory of the process of human interaction (Stacey et al. 2000). 'When people communicate with each other, conversationally or otherwise, to accomplish the joint action of living and acting together, they are, of course, continuously relating to each other in a responsive manner' (Stacey et al. 2000:188). A key concept that is essential in understanding organizations as CRPs is the idea that human communication and the act of relating occurs in the living present (here and now). The living present provides a starting point for conceptualizing causality in a new way. Rather than thinking of causality in a traditional rational way (moving toward a mature state or pre-selected goal), focusing on the living present allows us to conceptualize causality in a transformative way.

Choice and intentionality arise in, and influence, the micro-time structure of the living present. This brings us to the nature of novelty/change. In transformative causality, the future is under perpetual construction and is changed by our movement toward the future. "The future is unknowable but yet recognizable" (Stacey et al. 2000:52). From a CRP stance, human interaction is understood as paradoxical and dialectical (Fonseca 2002; Stacey et al.

2000), and our movement toward the future is movement toward an unfinished whole rather than a finished state. Having discussed the nature of CRPs and the living present as a new way to think about organizations, let us turn our attention to the role of leaders in CRPs.

Non-Causality and More Systems Thinking

One concept we seem reluctant to let go of from the bygone Industrial Age is the rational view of causality. The rationalism of the twentieth century framed the organization as progressing toward predetermined or preselected goals (the rise and popularity of strategic planning in the twentieth century is a manifestation of rationalist causality). The rationalist view of causality is that organizations are moving toward a future that is preselected by the organization or toward some other finished state (Stacey et al. 2000).

Another lingering organizational lens used extensively in the twentieth century is systems thinking. In a sense, systems thinking evolved as the twentieth century progressed. Early on, systems were viewed as machines, and later, we came to use systems thinking as a way to see organizations as living systems. Either way, systems thinking have been criticized for having an objectifying bias (Hamalainen & Saarinen 2006:17). That is, the person looking at the system necessarily views himself/herself as external to that system. The 'detached observer' is an easy and comfortable position for most people, as it has been used in many of the organizational leadership tools developed in the twentieth century. However, organizational life in the twenty-first century is highly complex and relational, and third-

person, detached views of organizational life fail to address the crux of leadership today. A new way of seeing and conceptualizing organizations is needed.

Informationology

"Informationology" is a contraction of the words 'information' and 'epistemology' and is the study of information roles (Shenk, 2009).Modern management has changed with the advent of an information-based economy. Information has changed interactions - with each other, with business and between businesses and entities**.** With information, there are a plethora of new meanings and decisions, there is a change in relationships and there is a change in the very way we conduct ourselves as individuals, as leaders and managers and as organizational entities. Pellissier (2001) states:

- *Relationships and communication:* Are formed across accepted boundaries. Competition is replaced by co-operation. A preference for one-to-one communication when sharing substantial knowledge. The more sensitive the information, the more we try to keep it private and hidden.
- *The elasticity of knowledge:* The value of information is a function of its utility, i.e. the specific use from the buyer. Thus, information may be expensive. The amount people are willing to pay and the lengths they are willing to go for knowledge are directly proportional to the need for it.

- *An over reliance on experts*: There is an over reliance to only accept knowledge from experts in a field, ignoring the possibility of new entrants into the information domain.
- *The trade-off between richness and reach:* Short, simple, superficial messages are easy and relatively inexpensive to communicate to a large group of people. For example, newspapers provide easy access to a variety of information, but there is little richness in the information. There is no opportunity to review the source or ask questions to determine objectivity or the source.
- *Tendency to control:* Information is power, and in an environment where there is one source of knowledge, power accrues to those who control the knowledge flow and can manage and distribute large quantities of information. In some way, the power of distribution becomes embedded in the technologies we acquire to do these functions for us.
- *Speed and innovation:* Competitive strength is measured in terms of speed to adopt change in terms of customer satisfaction. Large batch sizes decrease significantly. Continuous batches are replaced with discrete ones.

Information can be the most dangerous if not used or managed properly. It is a unique resource (sometimes) or commodity (sometimes). Information is intangible, reusable and

growable. It is completely different from the other very important resource, the people. An abundance of information does not guarantee quality or strategic value. The value of information lies in the quality, content and context of the information:

- Form, content, and time, i.e. information is only valuable if it is in the right format for use, is appropriate for use; and is available when required. Care should be taken that the information is obtained and developed for the specific purpose and can be used in a specific context.
- Care should be taken as to the richness and reach of information, i.e. the information developed should be meaningful and evocative enough to respond to (and exceed) the need and its source should be trusted.

There are many roles of information, some of which may even overlap (Shenk 2009; Anderson 1995): (1) as a complexity: the more information required specifying a system, the more complex it is; (2) as memory: information is a record of accumulated knowledge; (3) as communication: information is a means of social interaction; (4) as intellectual property: information with legally defined ownership interests; (5) as market enabler: information that permits efficient markets to function; (6) as context: information regarding the location, time or environment where the action takes place (Google in itself presents a self-organizing system organizing around and following questions asked), and, lastly as (7) enabler for social interaction: hits is highly visible in the rapidly growing social networks like Facebook,

MySpace and Twitter, by establishing links and building relationships as a ‘re-tribalization’ of humanity as expressed by Shenk (2009:932) when he talks about strict censorship of Internet connections in repressive governments.

Growing Complexities of Resource Allocation and The Need For Different Planning Models

The process of planning has to articulate the strategy and the management of that strategy. From planning comes the vital means of connecting the mission of the present to the vision of the future. Part of addressing goals, objectives and strategy implementation, involves the allocation of resources within budgetary constraints. This handicaps flexibility by its focus on cost cutting and efficiencies. Mostly, the budget defines the plan that defines the strategy.

Peterson (1999) addressed an essential ingredient of strategic planning, i.e. the organizational and environmental interface. Institutional planning must include a comprehensive process of monitoring and adjusting for realities of the external environment (Taylor, De Lourdes Machado & Peterson 2008). Complexity encourages a segmentation of the environment. This allows for the impact of the environmental factors on resources and resource flows to be examined, which helps determine resources predictability and the environmental locus of control with regards to resource flows. The strategic management and competitive advantage processes become linear and sequential rather than being seen as one

set of activities, related and linked as one. Figure 3 shows the linearity of such a process even whilst the internal and external environment may require non-linearity.

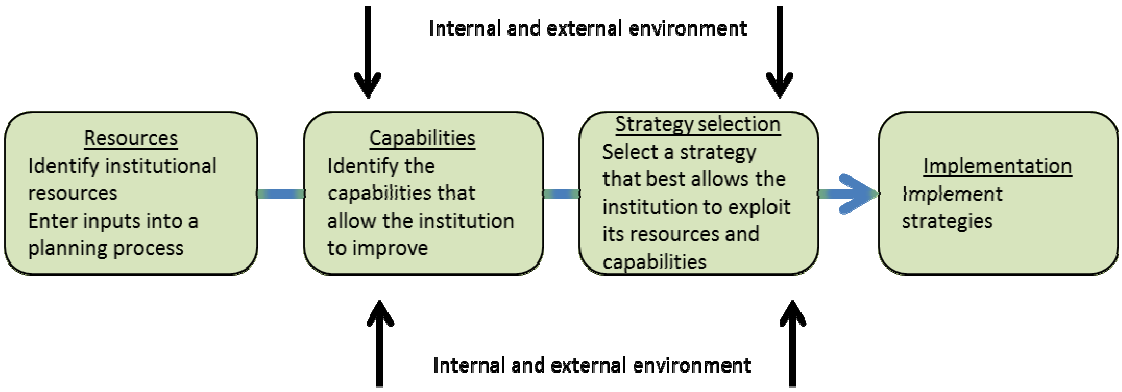

Figure 3. Using resources for strategy implementation and strategic advantage

This kind of planning relates more to operations than to strategy. Furthermore, resource allocation is not a linear process and cannot directly lead to strategy selection and implementation as is required in a linear model. This planning style does not relate to the need for adaptability with regards to the environment. The main goal of the strategic planning and implementation should focus on growth and maturity and not on internal processes and resources.

Complexity-Based Emergent Management Theory

The management sciences give us differing theories and strategies to compete in the international arena. These theories are based upon specific assumptions. These assumptions may differ. The outcomes may differ. Emergent theories confuse us further and add to the

confusion and complexity. Should we follow scientific management? Should we adopt a systems approach? Should we throw caution to the wind and adopt new technologies and focus on innovation? What about the people who need to be trained? The reality is that we can no longer ignore complexity as a science applicable to the business problems we face. There are numerous reasons for the introduction of complexity into management thinking: The management systems driving this evolution became more sophisticated at an exponential rate. There are many examples of this, for instance, Toyota's breakthroughs on improved process productivity, Shewhart's Statistical Process Control methods and Deming's TQC on improving the quality of mass produced goods, Smith's Six Sigma production-management system to enable manufacturing processes to achieve near zero defect, Altshuller's TRIZ (1996) and Mann's Hands-On Systematic Innovation (2009), moving management thinking into the space of 'structured innovative thinking'.

Complexity allows a two tiered focus in business – its performance system (responsible for the performance of current goals and tasks for immediate survival), and its adaptation system which is responsible for the long-term sustainability through the generation of new ideas, operations and behaviours. It generates possible futures for the total systems. Successful resilient organization should be robust in terms of both subsystems but tend to concentrate on only one (Robb 2000). The term complexity has two distinct applications (Standish 2008): (1) As a quality (i.e. complexity deals with our ability to understand a

system or object) and (2) as a quantity (i.e. complexity deals with something being more than complicated). Complexity as a quality is what makes the systems complex and complexity as a quantity describes, for example, human beings being more complex than a nematode worm. Thus complex systems constitute a class of systems that are more difficult to deal with than traditional analytical systems. For this reason, complex and simple systems form a continuum characterized by the chosen complexity measure. The two applications of complexity are inherently observer or context dependent, leading to a disparate collection of formalizations of the term. Thus, being able to establish easy to measure proxies for complexity is often important and most proposals for complexity are of this nature (Standish 2008:10). Complexity as a quantity can normally be decomposed in a linear way and can be directly compared (e.g. 5cm can be broken into 5 equal parts and directly compared). Complex systems on the other hand, cannot be divided and the individual segments compared. This is due to the interrelations between the subsystems that can quickly lead to combinatorial explosions. This leads to three definitions of complexity (Standish 2008): (1) The number of parts definition (a car is more complex that a bicycle because it has more parts, but a pile of sand is not as complex since each grain of sand is conceptually the same and the order of the grains is not important); (2) the number of distinct parts (since both a shopping list and a Shakespearean play consists of the same 26 letters of the alphabet, this is not a good measure of complexity); and (3) a context dependence definition of complexity.

When we relate business to a complex adaptive system (also called a learning system (Robb 2000), we look for ways to successfully adapt to changing environmental conditions. Complexity science focuses on relationships between individuals, teams or between organizations and businesses. Accepting business as being a complex system requires that we acknowledge that we cannot control organizations to the degree that a mechanistic perspective will imply but only that we can influence where the organization is going and how it will evolve. From this view, organizations are complex adaptive systems nested in larger complex adaptive systems (for instance the economy or the country it is based in or the industry it operates in). Lastly, complexity science allows an organic view of organizations and its resources. Resilient organizational structures, in focusing on the skills, culture and architecture, address this matter and will be discussed in a separate section.

Simon (1996) defines a complex system as one made up of a large number of parts that have many interactions. Complex systems change inputs to outputs in a non-linear way because the components interact with each other through a web of feedback loops (Anderson 1999:217). Thompson and MacMillan (2010:6) describe a complex organization as a set of interdependent parts which together, make up a whole that is interdependent with some larger environment. In organization theory, complexity is treated as a structural variable that characterizes both organizations and their environments. In terms of the first mentioned, Daft (1992:15) equates complexity with the number of activities or subsystems within the

organization. This, he maintains, can be measured along three dimensions, i.e. (1) vertical complexity (the number of levels in the organizational hierarchy), (2) horizontal complexity (the number of job titles or departments across the organization and (3) spatial complexity (the number of geographical locations). With regards to the environment, complexity is equated with the number of different items or elements that must be dealt with simultaneously (Scott, Gaylard, Wallace & Edmonds 1998:230). Galbraith (1982) proposes that organization design should try to match the complexity in structure to complexity in environment. Casti (1994) points out that, in non-linear systems, interventions to make a change to one or two parameters can drastically change the behaviour of the whole system. Moreover, the whole can be very different from the sum of the parts. Complex systems change inputs to outputs in a non-linear way because the components interact with one another via a web of feedback loop.

Complex adaptive systems (CAS) consist of agents that interact with each other and, in doing so, generate new behaviors for the systems as a whole.' (Lewin & Regine 1999). These lead to the following caveats: (1) Patterns of behaviour in these systems are not constant; (2) as the system's environment changes, so does the behaviour of its agents. Thus, the behaviour of the system as a whole can change; (3) complexity science focuses on relationships between individuals, teams or between organizations and businesses; (4) business as a complex system requires acknowledgement that we cannot control

organizations to the degree that a mechanistic perspective will and (5) it allows an organic perspective and the ability to deal with the human element in process design.

Furthermore, complex business models are designed to attend to the tensions of paradoxical strategies which may emanate from inconsistencies or contradictions in the products/services, marketplace, and/or processes, rewards and competencies associated with different strategies (Smith et al. 2010).

Modeling Non-Linear Outcomes

Rosen (1991) founded the school of thought believing that complex systems cannot be described by a single best model as reductionists care to believe. Instead, a whole collection of models exist that, in the limit, collectively describe the system. Standish (2008) mentions that in all cases of recognized emergence, the observer has defined at least one semantic and one syntactic model of the system. These models are 'fundamentally incommensurate' (p. 9). Moreover, emergence in this sense, can be called complex. Models that have a finite specification, can never be complex, since the specification contains all there is to know about the system.

It is not easy to compress non-linear systems into a parsimonious description. Simon (1996:1) believes that the central task of the natural sciences is to show that complexity is but a mask for simplicity. In the social and management sciences, the tendency seems to be to reduce complex systems to simpler ones by abstracting out what is unnecessary or not

important. Most organization scientists who view organizations as natural systems, point out that rules often do not govern actions and that rules can change without behavioral consequences, and behaviour can change without modifications to rule systems (Scott 1992).

Modeling normally entails encoding a natural system into a formal one by compressing a longer description into a shorter, simpler one. Since the more complex, the less knowable the organization is (Perrow 1967) it is not so easy with non-linear systems. Obviously causal models are inadequate because of the interconnectedness and feedback loops even when the relationships between the independent and dependent variables are denoted by some logarithmic or exponential function. There are six important aspects to be considered in modeling complex systems (Anderson 1999): (1) Many dynamic systems do not reach either a fixed-point or a cyclical equilibrium; (2) processes that appear to be random, may be chaotic, revolving around identifiable attractors deterministically and rarely return to the same state; (3) the behaviour of complex processes can be quite sensitive to small differences in initial conditions so that two entities with similar initial states can follow radically different paths over time; (4) complex systems resist simple reductionist analyses because of the interconnectedness and feedback loops preclude holding some system constant in order to study others in isolation. Since descriptions at multiple scales are necessary to identify how emergent properties are produced, reductionism and holism are complimentary strategies in analyzing such systems; (5) complex patterns can arise from the interaction of

agents that follow relatively simple rules, i.e. emergent patterns can appear at every level in a hierarchy and (6) complex systems tend to exhibit self-organizing behaviour, i.e. from starting in a random state, they usually evolve toward order instead of disorder (Kaufman 1995).

Modeling Non-Linear Outcomes Using Complex Adaptive Systems

There are many forms of dynamic systems, for example, general systems theory, cybernetics, chaos theory or catastrophe theory all address systems where a set of equations determine how a system moves through its state space over time. Another modeling technique examines regularity that emerges from the interaction of individuals connected in CAS. The presiding feature is that at any level of analysis, order is an emergent property of individual interactions at a lower level of aggregation. Anderson (1999), in his study of complex organizations, found that these organizations exhibit non-linear behaviors. He found that these organizations characterize four key elements that are prevalent in organization design: (1) Agents with schemata, (2) self-organizing networks sustained by importing energy, (3) co-evolution to the edge of chaos and (4) system evolution based on recombination. It follows that new models for complexity will require incorporation of these elements. Specifically, with regards to strategic direction and strategic management, complex organizations (1) establish and modify environments within which effective, improvised self-organized solutions can evolve and (2) managers influence strategic behaviour by altering the

fitness and landscape for local agents and reconfiguring the organizational architecture within which the agents adapt. Lewin and Regine (1999) identify five principles in complex adaptive systems (CAS):

1. Agents interact and mutually affect each other in a system: This focuses on relationships between and among people, teams and companies.

2. Agents' behaviors in a system are governed by a few simple rules: In business, rules become practices. These practices are guided by shared values and beliefs.

3. Small changes can lead to large effects, taking the system to a new attractor: Multiple experimentation on a small scale is the most productive way to lead change rather than to attempt to leap too quickly to a perceived desired goal on a large scale.

4. Emergence is certain, but there is no certainty as to what it will be: Create conditions for constructive emergence rather than trying to plan a strategic goal in detail. This includes nurturing the formation of teams and creativity within teams and evolving solutions to problems (not designing them). Hierarchical and central control should give way to distributed influence and a flat organizational structure.

5. The greater the diversity of agents in a system, the richer the emergent patterns: Seek diversity of people in terms of culture, expertise, age, personalities and gender, so that people interact in teams (thus creativity has the potential to be enhanced).

Most conceptual and empirical organizational modeling is based on a set of independent variables to explain the variation in one or more dependent variables. Therefore, outcomes at one level are explained by causal drivers at the same level of analysis. In CAS modeling, the question is how changes in the agents' decision rules, interconnections among agents, or fitness functions employed by agents produce different aggregate outcomes. Thus the models are multi-level because order is considered an emergent property that depends on how lower-level behaviors are aggregated. Finally, they fit into the current integrative, cross-level research in organization science. Table 2 describes each element and their contribution to a CAS model.

CAS models represent a new way of simplifying complexity by showing how complex outcomes flow from simple schemata and depend on the way the agents are interconnected, rather than reducing them to a set of causal variables and an error term. Rather than assuming that aggregate outcomes represent some homeostatic equilibrium (i.e. seek and maintain a condition of equilibrium or stability within its internal environment when dealing with external changes), CAS show that such outcomes evolve from the efforts of agents to achieve some higher fitness. All parts of a complex system should be viewed holistically, rather than focus on an agent in its local environment (which may be why the focus on processes, people or IT do not really work). In studying complex behaviour, one can even vary assumptions on the schemata, connections, fitness functions or the population

dynamics that characterize the agents (Anderson 1999). Furthermore, CAS allows for interdependencies which seem to be at the heart of modern organizations. CAS modeling and normal modeling are complimentary and should not be seen as an either-or-decision when analyzing organizations (see the discussion on paradoxes later in the paper). Causal theories and tests relating variables on the same level identify important aggregate regularities and factors that assist in creating them. CAS modeling then builds on this by explaining the observed irregularities as the product of structured, evolving interactions among lower level units. Successful models should be able to explain established findings and also predict aggregate regularities and causal relationships.

Organizational science has advanced through a combination of theoretical and empirical research. The study of CAS has been facilitated by the emergence of new computational technologies. Simulation is an obvious tool for modeling a set of complex, changing interactions over time. A limitation of simulation is that many equally plausible structures can lead to very different predictions and a given outcome can be explained equally well by a host of simulations with very different assumptions. There is a school of scientists that believe that the longer an organization has been in existence, the less likely it will allow for radical innovation (Anderson 1999).

Modeling Non-Linear Outcomes Using Agility and Resilience

The concept of strategic management is multi-faceted. The fundamental view of strategic management seems to be one of predicting the future, thinking strategically and then creating the future (Taylor, De Lourdes Machado & Petersen 2008). Gluck, Kaufman and Wallach (1980) suggest that strategic management must evolve by predicting the future (more effective planning), thinking strategically (increased responses, evaluation of strategic alternatives and dynamic allocation of resources) and creating the future (strategic planning deploying all resources to create advantage). Thus the deployment of all organizational resources, strategically driven by a flexible planning process that incorporates the institutional culture, means strategic management is at work. Mintzberg (1994) thinks that strategic management can be viewed from both a positive and a negative perspective: It provides direction to an institution and at the same time has the potential to propel it into a new direction ('perilous course into uncharted waters'). Overall managerial performance is best evaluated under the structure of a comprehensive strategic plan (Gayle, Tewarie & White. Jr, 2003). A strategy-making framework can be conceptualized that balances the opposing forces of alignment disruption (strategic thinking) and alignment creation (strategic planning), i.e. strategic management has linear and non-linear components embedded (see Figure 4). One begins with the circumstances of the present, moves into strategic thinking (which can disrupt institutional alignment), focuses on the desired future for the institution

Table 2. Elements in CAS modeling and design

ELEMENT	HOW TO MODEL	CONTRIBUTION TO ORGANIZATION THEORY Key elements of CAS modeling
Agents with schemata	At a specific level of analysis, one assumes that the outcome is produced by a dynamic system comprising of agents at a lower level of aggregation. E.g. agents =individuals, groups, coalitions; schemata=cognitive structure that determines what action the agent takes at time t, given its perception of the environment (at t or t-k). Different agents may or may not have different schemata and schemata may or may not evolve over time.	Since agents can process multiple competing schemata at any time, CAS modeling allows the possibility of evolution through a nested hierarchy of selective systems (Anderson, 1999). Anderson continues that, as schemata can evolve more rapidly than agents, CAS enjoy similar selective advantages when they allow schemata to complete and reinforce those that seem associated with favorable outcomes. One obvious advantage of this is that ideas, initiatives, innovations, creativity and interpretations form an internal ecology in the organization (McKelvey 1997). *Application to organizations* An example of a model incorporating the simultaneous evolution of agents and their schemata, is an organization that allows nine agents (each employing different rules) that all contribute to an aggregate decision. Action is taken only if all nine agents' recommendations are congruent. They have a fitness function that the organization tries to meet and a feedback function that compares the outcome of each decision w.r.t. the performance objective. Agents that contribute to successful decisions are more likely to participate in future decisions.

Self-organising networks sustained by importing energy	Agents are connected to each other by feedback loops. Thus the behaviour of a particular agent depends on the behaviour (or state) of some subset of all agents. Maintaining a self-organized state requires importing energy into the system.	Systems consist of independent actors whose interactions are governed by a system of recursively applied rules naturally generate stable structure. They self-organize, patterns and some regularity emerge without the intervention of a central controller. Drazin and Sandelands (1992) point out that, in observing order, one should search for a set of rules that explain how connections between agents at time t impact on those at time t+1. Rules thus generate structure because $state_2$=output of one application and becomes input for $state_3$. Definitely managers get in the way of activities because of their own regulation, form and self-correcting tendencies. Self-organization is the natural consequence of non-linear interaction (and not the tendency of an individual to prefer or seek order). When interactions of large numbers of components involve feedback loops, behaviors amplify and replace others. Groups of components become locked into self-reinforcing feedback cycles that lead to predictable collective behaviour. Prigogine and Stengers (1984) state that self-organization only occurs in open systems that import energy from the outside. Closed systems degenerate to a fixed-point equilibrium characterized by maximum disorder (2^{nd} law of thermo dynamics).A dissipative structure is a thermodynamically open system which is operating far from thermodynamic equilibrium in an environment with which it exchanges energy and matter. A defining feature of self-organization is a natural sequence of interaction between agents. Of course, as Weick (1979) pointed out, when there are too few components or not enough interactions among them, patterns tend not to emerge. In these cases, instead of making non-linear systems manageable by modeling complex building blocks with few interactions, one can, at least, make them understandable by modeling simple building blocks with many interactions. Order requires that the number of interactions stay within boundaries and, as such, order arises in CAS when components are partly connected. In this, Simon (1996) warns that systems where every element is connected with every other element in a feedback loop, are very unstable. In these cases, CAS form a decompositional hierarchy where elements are loosely connected. *Application to organizations* CAS modeling will require scientists to specify the pattern of connections among agents and not the pattern of connection among variables. CAS models require specifying how the behaviour of an actor at time t influences the behaviour at time t (or t+1 if there is a lag) of others with whom the actor has ties. This can be done using simulation.

Co-evolution at the edge of chaos	Agents co-evolve with one another. Each agent adapts to its environment by trying to increase the pay-off/fitness function over time. Individual payoff functions depend on choices made by other agents. Thus every agent's adaptive landscape is continuously shifting. The resultant equilibrium is dynamic not static, i.e. small changes in behaviour at time t can produce small/medium/large changes in outcomes t+1. Unlike chaotic equilibria where small changes can cause large outcomes, power-law equilibria lie at the edge of chaos (Kaufmann, 1995)	CAS theories assume that the adaptation of a system to its environment emerges from the adaptive efforts of individual agents that attempt to improve their own payoffs. Each agent is adaptive if its own actions can be assigned a value or payoff. Local adaptations lead to the formation of continually evolving niches, hence CAS operate far from the equilibrium of globally optimal system performance (Holland, 1995 and Miller, 1991). Bak (1996) proposes that all CAS evolve to a critical state that differs from traditional definitions of equilibrium. In ordinary equilibrium, small changes in the state of a system are self-correcting and the system quickly adjusts and settles back into its attractor state. In the state of self-organized criticality, a dynamic equilibrium prevails, such that small changes in behaviour can have small, medium or large impacts on the whole system. Kaufman (1995) argue that all CAS evolve to the edge of chaos, i.e. that point where small and large avalanches of co-evolutionary change cascade, because this state gives them a selective advantage. Systems that are driven beyond the edge of chaos out-compete systems that do not. *Application to organizations:* Brown and Eisenhardt (1998) suggest that the most effective organizations, evolve strategies that lie at the edge of chaos. Like Weick (1979, p. 215) they argue that organizations can continue to exist only if they maintain a balance between flexibility and stability. Furthermore, they contend that the strategic equilibrium over time is a combination of frequent small changes made in an improvisational way that occasionally cumulate into radical strategies and innovation, thereby changing the terms of competition fundamentally. The idea that a system (i.e.an organization) will experience small changes punctuated by infrequent, irregular, massive changes, is familiar in organization theory (Gersick, 1991). Most punctuated-equilibrium models set forth by organization scientists, rely on arguments that inertia builds up over time until the degree of misfit between the organization and its environment induces a crisis. Complexity theory suggests that a pattern over time of large and small changes is what one would expect from a system of co-evolving agents subjected to selection pressures.
Recombination and system revolution	CAS evolve over time by agents entering, exiting or transforming. Also new agents may form by recombining elements of previously successful agents. Links between agents may evolve over time, shifting the pattern of interconnections, the strength of each connection and its sign/functional form.	Simon (1996) points out that any adaptive entity contains an adaptive inner environment. Thus CAS are nested hierarchies that contain other CAS. These subsystems are therefore themselves subject to evolutionary pressures. Every aspect of a CAS (agents, schemata, the nature and strength of connections between them and their fitness functions) can change over time. New ones can appear. Old ones may become extinct. Existing ones can survive in a fundamentally new form. A fundamental aspect of CAS is that they allow local behaviour to generate global characteristics that alter the way agents interact (Buckhart, 1996). Actions not only proceed along feedback loops, they can also change these loops. *Application to organizations:* Technological innovations recombine elements of previous innovations (Fleming, 1998; Kogut and Zander, 1992). Groups, teams and project team forces, integrate the ideas and attitudes of their members and become arenas in which new ideas emerge from the interaction of members. Joint ventures generate novelty by recombining skills and processes inherited from the parent companies. In some corporate mergers, a new entity can emerge that blends elements from several formerly independent companies. At industry level, technological convergence can lead to the formation of new organizational communities that recombine elements of what were formerly distinct populations. These streams of research provide a rich foundation for modeling organizations as complex systems that evolve through the recombination of agents or schemata.

Source: Adapted from Anderson, 1999.

(vision) and then merges these factors into a strategic planning process (that ultimately creates institutional alignment). This evolving cycle is continuous and ongoing (Liedtka 1998). Strategic management creates an environment with consistency, but can also strangle creativity that thrives on inconsistency. With effective leadership, the negatives can be minimized.

Strategic Agility

Doz and Kosonen (2009) looked at strategic agility, believing that successful business model renewal and transformation are the main outcomes of strategic agility. They came up with specific activities that management should participate in in order to revolutionize their

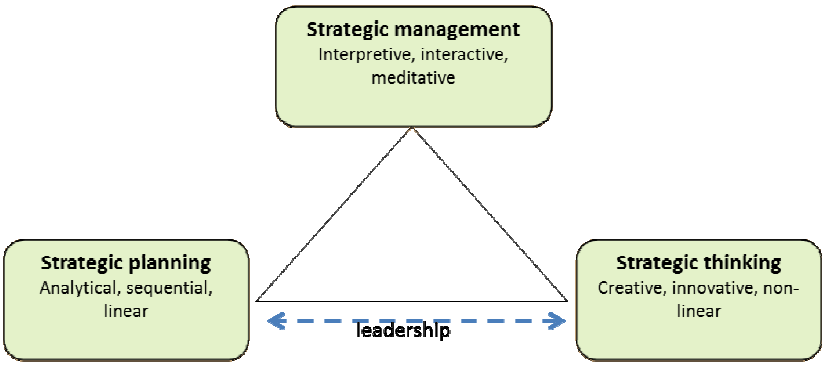

Figure 4. Strategic management as two activities: strategic planning (linear) and strategic thinking (non-linear)

business models. The authors conceptualized strategic agility as 'the thoughtful and purposive interplay' of management on three meta-capabilities: (1) strategic sensitivity (the sharpness of perception of and the intensity of awareness and attention to strategic developments); (2) leadership unit (the ability of management to make bold, fast decisions without being bogged down in win/lose scenarios; and (3) resource fluidity (the capability to reconfigure capabilities and redeploy resources rapidly) (see Table 3). They justify this by saying that (1) heightened

strategic sensitivity allows organizations to identify opportunities for new business models and also to be sensitive to the timely need for renewal and transformation of existing models; and (2) business model changes often involve hard decisions for management (this calls for adaptive and unified leadership); and, (3) resource fluidity allows firms to redeploy and reallocate their resources with regards to new opportunities and/or activities. This leads to the following sequential activities: anticipation, experimentation, distancing, abstracting, reframing, dialogue, revealing, integration, alignment, caring, decoupling, modularation, dissociation and switching in that order (see Table 3).

Inertia defends status quo or linearity. Linear strategy and linear problem solving techniques assume a rational and predictable sequence of events (Chance 2010). Problems are clear and well-structured from the start and require that resources and abilities are determined before the design phase. In fact, these prevent the designer from introducing new possibilities that present themselves in the course of implementation (Simon 1996). Strategic planning works best when seen as a continuous process of experimentation (see Table 3) that allows for multiple decisions or outcomes on many different fronts simultaneously (Leslie & Fretwell 1996). They believe that, from a management perspective, there are three caveats: linear, adaptive and interpretivist. Thus, for a strategy to accommodate non-linear aspects within or outside the organization, there are specific issues to address: (1) an iterative strategy; (2) emerging planning perspectives; (3) Decisions making spirals; (4) interactive learning and design thinking and (5) improvisation. We will discuss an iterative strategy as the other issues are embedded in this strategy.

Table 3. Developing an organizational mindset for redesign of business models/strategic management

HEIGHTENING STRATEGIC SENSITIVITY	
Anticipation	Sharpening foresight is the hallmark of strategy: This allows for deliberate reforms of business models to maintain strategic advantage and value creation. It explores future usage concepts. There should not be an over-reliance on foresight tools (e.g., scenario planning).
Experimentation	Gaining insight: Probing, discovering 'lead locations,' innovation hotspots as precursor to renewal. Change core business assumptions, or at least help define them.. Strategic and reflective use of corporate venturing.
Distancing	Gaining perspective: Being able to stand outside one's own organization allows to both model it and begin to imagine the whole system of activities and relationships. Hearing the voice of the periphery.
Abstracting	Gaining generality: From a distance one can abstract better what are generalizable. Restating business models in conceptual terms.
Reframe	Imagining new models: Considers the possibility for different model. In rigid organizations, this happens because of burning platform need. Try to develop multiple strategic frames for business model. For this, one needs high quality, open and honest dialogue around strategic issues, the use of flexible strategy teams and collaborative decision-making.
FOSTERING LEADERSHIP UNITY	
Dialogue	Surfacing and sharing assumptions, understanding contexts: Explore underlying assumptions and hypotheses at length and not as quickly as possible to reach consensus. Develop common ground. Welcome open expressions of differences. What should emerge is a collective commitment.
Revealing	Making personal motives and aspirations explicit: Transparency and clarity of motives develop mutual respect and trust and an understanding of positions.
Integration	Building interdependencies: Define a valuable common agenda that conditions success. Answer the question 'Why do we need to work together?' Work towards running, collectively, an integrated business.
Alignment	Sharing a common interest: Beyond incentives, give deeper common meanings by having a compelling mission (shared values can assist in this).
Caring	Providing empathy and compassion for empowerment: Caring companies create a capability to empathize with others and to be attuned to their emotional needs and expectations.

	These provide personal safety and mutual respect needed to attempt new things.
APPLYING RESOURCE FLUIDITY	
Decoupling	Gaining flexibility: Allow systems to evolve through modifying one element that subsequently creates sufficient tension in another that it adapts and changes.
Modularation	Dis-assembling and re-assembling business systems: Develop 'plug and play' functionality for business systems and processes.
Dissociation	Separating resource use from resource ownership: Disassociate organization structure (roles and responsibility) from the underlying business processes and IT systems and from their strategy. This allows for greater structural flexibility within a given business model.
Switching	Using multiple business models : Create different and parallel business models. Switch products between these when required.
Grafting	Acquiring to transform oneself : Difficult to initiate different business models internally Import a business model from acquired company .

Source: Doz and Kosonen, 2010, p. 372.

Iterative Strategy

In this strategy, the designer continually revisits key objectives throughout the planning and implementation process. Making use of iterative thinking, problems are defined and paired with the relevant solution. The problem is seldom known at the outset of the design, but the strategy is relatively reactive. The strategy is designed using decision-making spirals, interactive learning, improvisation and complexity theory. The complex solution will identify patterns within systems that initially appear chaotic. The solution is similar to Chrismond's (2008) design strategies rubric (see Table 4). Organizational Resilience

The concept of resilience has reached maturity over the past decade. Robb (2000) defines a resilient organization as one able to sustain competitive advantage through its capability to (1) deliver excellent performance against current goals, whilst, in paradox, (2) effectively innovating and adapting to rapid, turbulent changes in the environment. The first requires consistency,

Table 4. Planning and executing organization design using iteration

DESIGN PHASE	LINEAR DESIGN	NON-LINEAR DESIGN
Explore the	Premature decisions - make choices too soon, after reading brief.	Delay decisions - hold off from making decisions until exploring the challenging.
	Skip research - and instead start posing solutions immediately.	Do research and information searches about the problem.
	Do few or no early investigations or conduct confounded experiments.	Do valid tests to help designers quickly about the design.
Generate, build communicate	Idea fixation - get stuck on their first design ideas that they will not let go	Practice idea fluency - via brainstorming and rapid
	Describe and sketch devices that not work if built.	Use words. drawings and models explore design ideas and show parts connect and work together.
	Have a generalized, unfocused way to view tests and troubleshoot ideas.	Use diagnostic vision to focus attention on problems and ideas/devices.
Test and evaluate reflect on	Ignore or pay too much attention to or cons of ideas without also thinking benefits and tradeoffs.	Balance systems of benefits and tradeoffs when making design decisions, and use rules of thumb make choices.
	Design in haphazard ways. working whatever problems emerge. Do design a set of steps done once in linear	Do design as a managed, iterative process, using feedback to ideas. Strategies used in any as needed.
	Do tacit designing with little self-reflection and monitoring of	Practice reflective thinking by keeping tabs on design work in a meta-cognitive way.

Source: Chance, 2010, p. 48.

efficiency, elimination of waste and maximizing short-term results, whilst the second requires foresight, innovation, experimentation and improvisation, with an eye on long-term benefits (Johnson-Lenz 2009). The two modes require different skills sets and organizational designs (for example, move from JIT production to 'just-in-case' resilience). These organizations exhibit particular characteristics in the sense that they (1) can create structure and dissolve it; (2) provide safety in the face of change (although this is not necessarily security or stability); (3) manage the emotional consequences of continuous transformation, change, anxiety and grief; and, (4) learns, develops and grows. The resilience community agrees that resilience architecting (also called

resilience engineering) occurs over the three phases of a disruption. In the pre-disruption phase the system should take steps to anticipate the disruption and avoid the disruption, if possible. In the survival phase the system should absorb the disruption so that it can recover in the recovery phase. In the recovery phase the system resumes some degree of its original goals, including the survival of the humans in it. Disruptions are the initiating event that may lead to a catastrophic event. Human error is a common source of disruption. However, the resilience of the entire system will determine whether the system is prone to catastrophe. Disruptions may be either external, such as terrorist attacks or natural disasters, or they may be internal, such as human or software errors. The phenomenon in which systems fail when the components function as designed is discussed.

Resilience has four primary attributes: capacity, flexibility, tolerance, and inter-element collaboration. Capacity requires that the system be sized to handle the maximum and most likely events, such as terrorist attacks and natural disasters. However, a system cannot depend on capacity alone; the other attributes must be present to handle unpredicted events. Capacity includes functional redundancy. Flexibility requires the system to be able to reorganize. For example, plans must be in place to allow the command and control to shift upwards in the event of a serious disruption, such as a terrorist attack. Tolerance allows the system to degrade gracefully in the face of an attack. That is, all resources would not become inoperative after the first strike.

One of the most important resilience attributes is inter-element collaboration. This attribute allows all elements of the system to interact and cooperate with each other as in collaborative innovation systems. There are numerous activities relating to resilient organizations. These are (Pellissier 2011:156):

1. *Resilient organizations actively attend to their environments.* Monitoring internal and external indicators of change is a means of identifying disruptions in advance. Resilient organizations seek out potentially disturbing information and test it against current assumptions and mental models. They work to detect the unexpected so they can respond quickly enough to exploit opportunity or prevent irreversible damage. In short, they anticipate being prepared.

2. *Resilient organizations prepare themselves and their employees for disruptions.* **A**ttentive preparations build a team that imagines possibilities and displays inventiveness in solving problems. Managers know how and when to allow employees to manage them for focused productivity as well as adaptive innovation. Resilient organizations cross-train employees in multiple skills and functions. They know that when people are under pressure, they tend to revert to their most habitual ways of responding.

3. *Resilient organizations build in flexibility.* Even while executing for lean and mean performance, resilient organizations build in cushions against disruptions. The most obvious approach is the development of redundant systems – backup capacity, larger inventories, higher staffing levels, financial reserves, and the like. But those are costly and not always efficient. Flexibility is a better approach.

4. Engaging suppliers and their networks in devising makeshift solutions to temporary disruptions is a flexibility strategy. So are policies that encourage flexibility in when and where work is done. Employees who are used to telework and virtual workspaces adapt more quickly and are more productive following a crisis. In addition, research shows that flexible work practices contribute to greater employee resilience, productivity, and commitment, and to lower levels of stress.

5. *Resilient organizations strengthen and extend their communications networks – internally and externally.* A robust and redundant communications infrastructure holds up in a crisis. Social networks among employees at resilient organizations are rich, varied, and visible. People who have trust relationships and personal support systems at work and with friends and family are much more able to cope with stress and change. Good connections and communications also apply to external relationships with suppliers and customers. A key is to recognize what's important to meet organizational goals and to listen to those with needed expertise and ideas wherever they are in the value web. Resilient organizations use networked communications to distribute decision-making. As much as possible, they push decisions down to where they can be made most effectively and thus quickly. This in turn requires good access to information at all levels of the organization.

6. *Resilient organizations encourage innovation and experimentation.* In times of great uncertainty and unpredictability, the success and failure of small-scale experiments can help map a path to the future. Resilient organizations engage in market research, product development, and ongoing operations and service improvements. They invest in small experiments and product trials that carry low costs of failure.

7. Resilient organizations foster a culture of continuous innovation and ingenuity to solve problems and adapt to challenges. A side benefit is that employees who believe they can influence events that affect their work and lives are more likely to be engaged, committed, and act in positive ways associated with resilience. Some organizations also have internal idea markets to surface new ideas and innovations. Others use "crowdsourcing" to engage people externally in solving a given problem.

8. *Resilient organizations cultivate a culture with clearly shared purpose and values.* When an organization's sense of purpose is shared by its employees, suppliers and customers, those networks can provide flexibility to help it through a disruption. Engaged employees will seek out opportunities to try new approaches, find creative solutions, and achieve great results.

Chaos Theory

The relationship between chaos and complexity is sometimes contested. The range of opinion includes: chaos is a sub-discipline of complexity; chaos and complexity are interchangeable and the distinction is arbitrary; the two phenomenon have different origins and should not be considered together; the 'zone of complexity' sits at 'the edge of chaos'; the study of chaos is unhelpful and should be ignored. A useful starting point from an organizational perspective is to see complexity theory as the qualitative study of nonlinear systems drawing its metaphors from chaos theory (Gleick 2004). From an organizational perspective, the following is useful: chaos and complexity theory studies dynamic non-linear systems i.e. systems that change with time and demonstrate complex relationships between inputs and outputs due to reiterative feedback loops within the system. The quantitative study of these systems is chaos theory. Complexity theory is the qualitative aspect drawing upon insights and metaphors that are derived from chaos theory.

There are five principles pertaining to chaos theory (Pellissier 2011):

1. *Non-linearity*: Small changes can induce large effects, having little semblance to their beginning - everything beyond short-term predictions are impossible. (Link to organizational design: Technology can bring more for less. Leadership changes. Customer/technology changes).

2. *Feedback*: Output at every step in the system provides material for a new outcome, thus amplifying deviation & destabilizing the system even more, introducing new patterns. (Link to organizational design: Organizational memory allows no turning back only forward).

3. *Bifurcations*: Cusp. Occurrence can be predicted, but not the outcomes. (Link to organizational design: **r**adical change through IT, change in environment. Customers, markets, leadership).

4. *Strange attractors*: Inherent state of affairs/underlying order. (Link to organizational design: Culture, shared values).

5. *Scale*: Interpretation depends upon the scale. (Link to organizational design: Economies of scale, systems).

6. *Fractals:* Show similar (not identical) patterns at successively greater magnitude. (Link to organizational design: Systems theory, holonism).

7. *Self-organizing principle*: The ability to reorganize. Unstable combination of randomness and plan, broken by flashes of change. (Link to organizational design: Tribalism, feudalism, nationalism, customer needs & market changes, co-opetition).

Chaotic systems are characterized by three key properties: predictability, extreme sensitivity to initial conditions and the presence of an attractor or pattern of behaviour. Chaotic patterns form the signature of non-linear behaviour that arises from recursive feedback among a system's components i.e. the output of one stage feeds back into the input of the next. (This recursive or re-iterative feature is critical to complex systems as it sets the focus of attention at a local level.) Chaos theory can be used to identify patterns in systems that initially appear chaotic. The main tenets of the theory comprise of self-organization, fractals and strange attractors. Similar to the design in Table 4, chaos theory recommends using a diagnostic approach to design

of models and strategies. Chaos theory purports that certain types of issues/issues/solutions naturally gravitate towards one another in a self-organizing way. This is denoted a strange attractor as the issues/problems/solutions do not appear compatible. It allows for complementary forces to work together towards a common goal. The principles of self-organization run counter to assumptions that (1) tight control is required to prevent breakdown and (2) organizations should expend considerable efforts to rectify obvious symptoms of a problem. Chaos theory provides an excellent way to deal with external uncertainty and shocks that transcend normal planning. Informal networks of people can be allowed to develop creative ways of meeting goals and building strategies.

Modeling Non-Linear Outcomes Simultaneously Managing Strategic Paradoxes

Contradictions are not new to organizations. Lewin and Regine (1999:291) believe that, from a complexity perspective, paradoxes are not problematic and needing to be solved. Instead, paradoxes create tension from which they say creative solutions can emerge. Gavettie and Levinthal (2000), Miles and Snow (1978) point out that organizations have to be big and small, efficient and effective, operate in multiple time lines and be prospectors and analyzers. Bunderson and Sutcliffe (2002) and Flynn and Chatman (2001), point out that management teams are required to search backward and forward, be flexible and focused and learn and unlearn. It appears that successful competitive advantage and strategy will be rooted in building existing products that cannibalize those existing products. Innovation at the expense of existing products leads to sub optimal results as organizations fail to capture the on-going benefits of historically rooted efficiencies (Smith & Tushman, 2005:523). Existing products provide slack resources, knowledge and processes to launch innovation. Similarly, innovation generates new knowledge and technologies, access to new markets and increased customer awareness and

growth (Gibson & Birkinshaw 2004). This clearly indicates a shift to organizational adaptation in balancing contradictory activities. Therefore it follows that sustained performance is rooted in simultaneously organizing short-term efficiency and long-term innovation, creating a new set of organizational challenges. We have already established that an either/or approach to strategic tension is not adequate. Organizational strategy should be capable of meeting the challenges of an increasingly complex environment if management intends to exploit existing businesses and explore new ones (Smith et al. 2010). The authors continue to suggest that success over time should be rooted in and 'both/and' approach, rather than the accepted 'either/or' one in general use. Furthermore, they favour paradoxical strategies and their associated product, market and organizational designs. The term paradoxical refers to multiple strategies that are contradictory yet inter-related. This can include contradictory or inconsistent products, markets, technology and other resources that can reinforce each other. A design may be internally consistent within each strategy, but inconsistent (or contradictory) over strategies. One example of such a paradox is the competition between an exploratory strategy (focusing on the introduction of products and services that can define new marketplaces) and market exploitation (that seeks to refine and improve products in an existing marketplace). Exploring new opportunities looks into the future and involves variance-increasing activities and risk-taking. Therefore it is more successfully undertaken in organic, decentralized, flat structures. On the other hand, exploiting existing products is rooted in the past and involves variance-reducing activities and risk minimization. The latter thrives in a more mechanistic, centralized, hierarchical structure. Smith and Tushman (2005) write that, where exploitation builds on an organization's past, exploration creates a future that may be very different from the past. In fact, products coming out of exploration are often in direct competition with existing products. The work done by Smith, et al (2010) shows

that exploratory and exploitative goals must compete for scarce organizational resources and market share. March (1991) believes that successful exploration can directly oppose established exploitation, yet he feels that there is an increasing need for organizations to explore and exploit simultaneously. Other examples of managing paradoxes include the adoption of both a social and financial strategy simultaneously, strategies that are both global and local, strategies focusing on low cost and high quality (Williamson 2010), stability and agility (Doz & Kosonen 2010), learning and performance (Itami & Nishino 2010) or profitability and social outcomes (Thompson & MacMillan 2010).

Deploying such paradoxical strategies requires complex business models that can manage the inherent tensions involved and enable contradictory agendas to thrive at the same time. It also puts added pressures on management to make decisions w.r.t organizational designs and resource allocation balancing a new set of agents and schemata. Smith, et al, (2010) identified the main functions and structures that can effectively execute paradoxical strategies: (1) dynamic decision making; (2) building commitment to an overarching vision and specific goals; (3) actively learning about each agenda and the relationships between them; and, (4) engaging conflict. They believe that by enabling management to collectively support continued tensions rather than finding resolutions limit the long-term strategic opportunities. In this, they favor complex models that can host contradictions in this way in order to develop dynamic, flexible and adaptive capabilities to succeed in the short- and long-term. Smith et al. 2005; Smith et al. 2010) list three examples of complex business models, i.e. ambidextrous organizations (hosting paradoxical strategies through differentiated sub units for each revenue stream linked by targeted mechanisms and teams through the behaviors of senior management), social enterprises (hosting paradoxical tensions between the social good and financial profit strategies) and learning

organizations (hosting tensions between learning and performance, stability and change, control and flexibility, alignment and adaptability). In all of these models, resource allocation has to be decided subject to the tensions between existing products and innovation. Smith and Tushman (1999:526) developed a model to allow strategic contradictions. Their model focuses on paradoxical cognition (a cognitive frame and a paradoxical frame that allow for cognitive processing to allow for the co-existence of contradictory agendas and develop synergies and integrative results.

The idea that inconsistent and contradictory agendas exist is not new in the literature (Lewis, 2000; Poole & Van de Ven 1989). Rather, what is to be determined is to what extent and how can contradictions be supported and embraced within one set of strategic elements? The disadvantage of working with organizational tension is that it can easily provoke defensive responses leading to downward cycles. For example, Smith, et al (2010) mention a defensive response to avoid actually engaging with contradictions and to choose only one agenda and continue to over emphasize and support this – even after it is no longer required. On the other hand, engaging in contradictions enables a virtuous cycle where commitment to both strategies builds dynamic and creative opportunities. Thus tensions within complex models ensure resilience in turbulent and complex environments, thus allowing for a greater ability to respond and to innovate (Pellissier 2010).

When all elements of strategic management (structure, strategies and competencies) reinforce each other, inertia is the dominant force and there is a preference to short-term over long-term and the certainty of success over the risk of failure (Levinthall & March 1993). Sull (1999) found that these structural and psychological forces for inertia tip the balance of resource trade-offs against innovation. Paradoxical strategies change the management focus from should

we implement A or B? to implementing both A and B simultaneously. This shift in strategic focus allows for the emergence of new business models. In an increasingly competitive and unstable environment, complex business models have become a source of competitive advantage. For one, this requires allowing for internal contradictions and tensions may be an important differentiator of organizational excellence. In addition to modeling non-linear, dynamic behaviour in organizations, CAS theory has implications for strategic management of organizations.

Conclusion

Unlike systems with a fixed-point or cyclical equilibrium, the instability in the global environment, has a more dynamic equilibrium in which actions can lead to small, medium or large cascades of adjustment. Thus the aim of management and strategy is to evolve advantages more rapidly than the competition. Complexity theory is particularly relevant for organizations facing rates of external change that exceed their internal change (McKelvey 1999). In environments far from equilibrium, where change is continuous and overlapping, adaptation must be evolved, not planned. Adaptation is the pathway of an organization through an endless series of organizational microstates that emerge from local interactions amongst agents trying to improve their local payoffs. The task of strategic direction is not to foresee the future or to implement enterprise-wide adaptation programs because non-linear systems and models react to direction in ways that are difficult to predict or control. Management should rather establish and modify the direction and boundaries within which effective, improvised, self-organized solutions can evolve (Meyer, Frost & Weick 1998). They set constraints upon local actions, observe outcomes and tune the system by altering constraints while raising or lowering the amount of energy injected into the dissipative structure they are managing.

Brown and Eisenhardt's (1998) application of complexity theory to strategic management suggests that single business units achieve rapid evolutionary progress through improvisational moves based upon a few simple rules, responsibilities, goals and measures. These authors offer a new strategic paradigm for navigating the treacherous waters of modern tumultuous markets: ' *the key strategic challenge facing managers in many contemporary businesses is managing this change. The challenge is to react quickly, anticipate when possible, and lead change where appropriate. A manager's dilemma is how to do this, not just once or every now and then, but consistently*.' Brown and Eisenhardt argue that '*competing on the edge is the unpredictable, often uncontrolled, and even inefficient strategy that nonetheless defines best practice for managing change*." For them and many others, *Change* and *challenge* may be the most overworked words in today's business lexicon, but there are no better synonyms to describe the possible chaos in the environment. The traditional practices of strategic definition and execution that appeared to work well until recently are no longer even effectual. Determining an end-point, agreeing on basic assumptions, and mapping the process toward a fixed objective over a defined period of time no longer work. Following a map that fails to represent a constantly changing landscape seem foolhardy. They conclude with ten laws for competing on the edge: Advantage is temporary, strategy is diverse, emergent, and complicated, reinvention is the goal, live in the present, stretch out the past, reach into the future, time pace change, grow the strategy, drive strategy from the business level and rematch businesses to markets and articulate the whole.

Synergy amongst units follows when units have distinct roles participating in the larger focus. Collaboration is focused on a few key areas. Evolution is preferred over the radical revolution preached and implemented by the re-engineers of the 1990s. Portfolio elements should be recombined so that novelty is deliberately generated without destroying the best

elements of the past experience. Management can either alter the fitness landscape for local agents or they can reconfigure the organizational design within which the agents adapt. In both cases the strategist operates on agents directly, taking advantage of the many local interactions to self-organize into a coherent pattern. More than sharpen the pattern that constitutes a strategy, management shapes the context within which it emerges. The role of CRPs and CAS models can no longer be ignored.

There is no dispute in the research of the last two decades that new management models are required because of the changes in the world as we know it. Organizations are living systems, organic and made up of the people, the processes and the technologies, all of which are changing. CRPs and CAS provide an approach to the management sciences and particularly to strategic management, to rethink the linearity of our designs and systems and to allow for equilibrium to take place. It requires us to acknowledge that paradoxes can exist, even be embraced. Paradoxes in themselves fluctuate at the edge of the mechanistic and the organic. Although the idea of paradoxes can in itself be viewed as an either/or view of the workplace, used correctly it provides synergy and allows for better long-term planning without letting go of the short-term objectives.

Future research can model innovation and renewal as the outcome of interaction among a variety of organizations that pursue better technical performance in a co-evolutionary competition with each other. The following empirical data should be collected: Who are the agents? How many organizations compete in this space? What are their salient characteristics? What are the agents' schemata? How are agents connected? How do these connections change over time? What pay-off functions do these agents pay attention to? What trade-offs are they willing to make among different pay-offs? How do these actions affect the payoffs of others?

What is the pay-off structure of the evolutionary game they appear to play? In understanding how organizations can effectively manage their paradoxical (internal and external) environments remains a critical question for management scientists. In the end, decisions are made by top management. Thus, new leadership challenges and decision-making are required and need to be researched to allow for these models to be implemented. What we did not address, was a determination on which organizations, industries or countries are more suited to complex design models (our scan through the literature indicated advancements in health sciences and education using some form of CAS). Or more so, would manufacture or service industries be similar in their approaches? Or would industries directly related to technology change be the ones to address these issues first? At what stage in the organization life cycle is it preferred to allow complexity? These should still be determined. The theoretical frameworks exist, it is up to modern management to change their mindset and use these.

Lastly complexity is neither complicatedness nor over-determination. Complexity science is fundamentally a new way of looking at physical, biological and social phenomena. It is a cross-disciplinary field with its own approach to knowledge-creation that includes a set of methodological approaches. As such, it offers distinct and innovative perspectives on the evolution of systems and the behaviors of the actors within them. And, note that complexity in itself is not an either/or to traditional management models. Instead, it expands and augments these models.

> *'Organization theory has historically borrowed from a number of parent disciplines. Because complexity theory has developed along a very interdisciplinary path, it may be that in the end, organization theory contributes as much as it borrows to the development of insight into the behavior of complex systems. Many modern organizations are complex adaptive systems par excellence, and we who study them should eventually lead instead of follow efforts to understand the fundamental nature of non-linear, self-organized structures.'*
> *Anderson, 1999, p.230.*

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INFORMATION SYSTEMS STRATEGIC PLANNING TO INCREASE COMPETITIVE ADVANTAGE OF HIGHER EDUCATION USING BE VISSTA PLANNING METHODOLOGY (CASE STUDY: SWCU SALATIGA)

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Abstract

Information system and information technology (IS/IT) has taken great effect in business process of an organization. The research was conducted at the Satya Wacana Christian University (SWCU). SWCU perceived in running business processes is not optimal in making the application of IS/IT in the organization. Implementation planning process/IT has not been done equally for all business units, yet have SWCU Executive Information Systems (EIS) which can assist in the decision making process. Process of strategic planning of information systems using Vissta Be Planning has compiled some information systems strategic planning methods. Results obtained the study of the needs of the IS/IT in SWCU which obtain an application portfolio that will implemented in the institution.

Keywords: Information Systems, Executive Information System, Strategic Planning, Competitive Advantage, Be Vissta PEST, Value Chain Activity, Strategic Grid, Application Portfolio.Planning, Five Forces

Introduction

Information system and information technology (IS/IT) has taken great effect in business process of an organization. IS/IT not only given the efficiently improvement and effectivity of organization work but also has become the main factor toward organization in order to perform the business process and to gain the business objective of the organization by: create new ways in managing organization, improving the productivity and performance, developing new business and finally give the competitive supremacy (Ward, J., et. al., 2002). Nowadays, IS/IT is expected to be one kind of aspect from business strategy of an organization so the objective of the organization will be reached. One of organization objective is reaching competitive superiority in global market within the way of how the organization able to integrate all the data they owned which can be help making benefit information that can be used to help organization management is doing the business process. The use of IS/IT in giving the competitive superiority today still can not be found. The subject of problem in here is how making the organization able to harmonize between business strategies with IS/IT strategy in order to create organization competitive superiority.

To overcome these problems, the organization shall conduct thorough strategic planning of IS/IT that have been or will be applied. It is important, because it will be used as a basis for managerial decision-making about application of IS/IT in the future. Managerial decisions regarding IS/IT is applied in an organization related to how IT Governance that have been established. IT Governance as a system to direct and control an organization in achieving its goal by utilizing the IS/IT and processes within it need a strategic plan in order to obtain benefits (Weill, P., et. al., 2006). To ensure that the strategic planning of IS/IT is one of the pillars of an IT Governance, it is necessary to answer the following questions: (a) Are we doing the right

thing; (b) Do we do it the right way; (c) Does we do well; (d) Do we get the benefit. Answers to four questions will be referred in the process of strategic planning IS/IT in an organization. Strategic Planning IS/IT is absolutely necessary for every organization that will utilize IS/IT.

Satya Wacana Christian University (SWCU) Salatiga as one of the non-profit organization is an educational institute, has long been implementing IS/IT in any organization's business processes. However, each IS/IT is used in this organization have not been able to provide output that can help the leaders in upper management level (top level management) in SWCU to determine the business strategy forward. The impact of that is the difficulty for top level management to take decisions in the process of planning, controlling, monitoring, and performance improvements in business processes institution. Therefore, it is necessary to do a strategic planning IS/IT in an environment that is able to align SWCU between business strategy and strategic IS/IT, so SWCU can achieve business goals effectively and efficiently.

In preparing the strategic plan IS/IT in SWCU, we use the method Be Vissta Planning (BVP) which is a method to produce a strategic planning IS/IT that combines various methods of strategic planning IS/IT which has advantages such as being able to analyze the information gap between business activities and IS/IT is used and can provide a competitive advantage based on the opportunities that are owned by the SWCU (Pavlou, A. P., et. al. 2006). Then, the results of strategic planning IS/IT able to answer a variety of business requirements based on the analysis of business environment and the environment IS/IT environment both internal and external environment.

Review of Literature

Research on information systems strategic planning using BVP methodology to develop a strategic plan based on the business benefits of information systems that produce a blueprint for

systems, technology and information management in an industrial company (Haris, W., 2002). In that study, researchers analyzed the literature related to information systems strategic planning methods. Various methods of strategic planning is then compiled into a method. There are several things that can be summed up in these studies, among them the BVP methodology must be equipped with a list of questionnaires to help sharpen the analysis of the needs of business and IS/IT organization. Other research is the methodology used to develop the strategic plan BVP/IT-related increase in revenue (PAD) (Ellensyah, K., 2003). BVP methodology used has been adapted to the case study object, the service-oriented organization, in this case the provincial government (province) of Jakarta. Researchers try to develop a strategic plan/IT-based business benefits for the city government, where the strategic plan/IT can be a reference in the manufacturing-based governance of information technology (e-Government). In this research, BVP used to analyze the internal and external IS/IT of the Government of DKI Jakarta. Based on the analysis, was made a breakdown potential of IS/IT, which is then mapped to each of the relevant agencies PAD. Having identified the potential of IS/IT from each institution, then later made proposals IT infrastructure that supports the potential of IS.

Strategic Planning IS/IT is a process of identifying a portfolio of computer-based application that will support organizations in the implementation of business plans and realizing its business objectives (Ward, J., et. al., 2002). Strategic Planning IS/IT study the effect of IS/IT on business performance and contribution to the organization in selecting the strategic steps. In addition, strategic planning IS/IT also explains various tools, techniques, and frameworks for management to align IS/IT with business strategy, and even find new opportunities through the application of innovative technologies. Some characteristics of strategic planning IS/IT, such as, the primary mission: strategic or competitive advantage and its relation to business strategy; the

direction of the executive or senior management and users; as well as the main approach in the form of user innovation and development combined bottom up and top down analysis. Figure 1 shows a schematic model of the strategic planning of IS/IT.

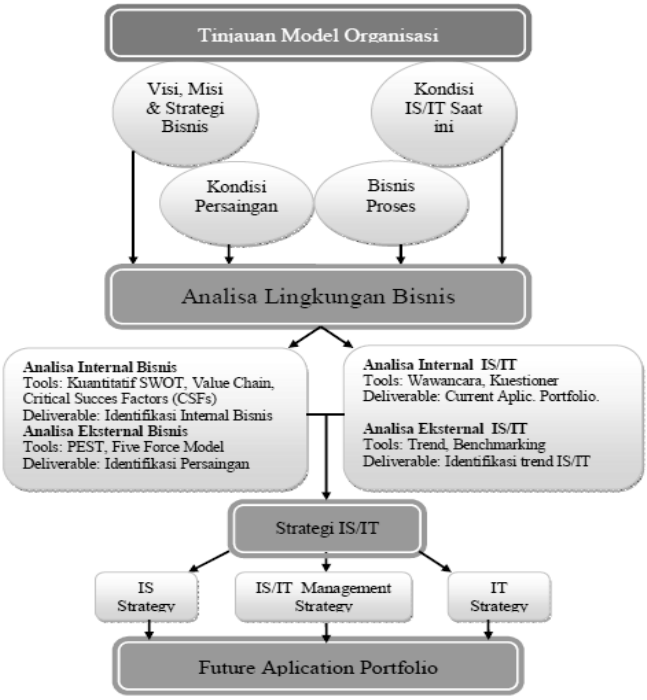

Figure 1. IS/IT Strategic Planning Method
(Ward, J., et. al., 2002)

Research Methods

The research method which will be done in this research is in Figure 2. In the first phase, researchers will be guided by strategic information systems planning methodology proposed Ward and Peppard (Ward, J., et. al., 2002) that will analyze the business environment and environmental analysis of IS/IT organization's internal and external advance. The second stage until the fourth stage, investigators using methodologies BVP. The first stage is intended to get an overview about the state of organization and business processes conducted institution. This

stage is part of phase 1 methodology BVP, which is examining the needs of the organization. Input required in this phase is obtained from the vision and mission of the organization's business processes SWCU especially in the areas of academic and information technology.

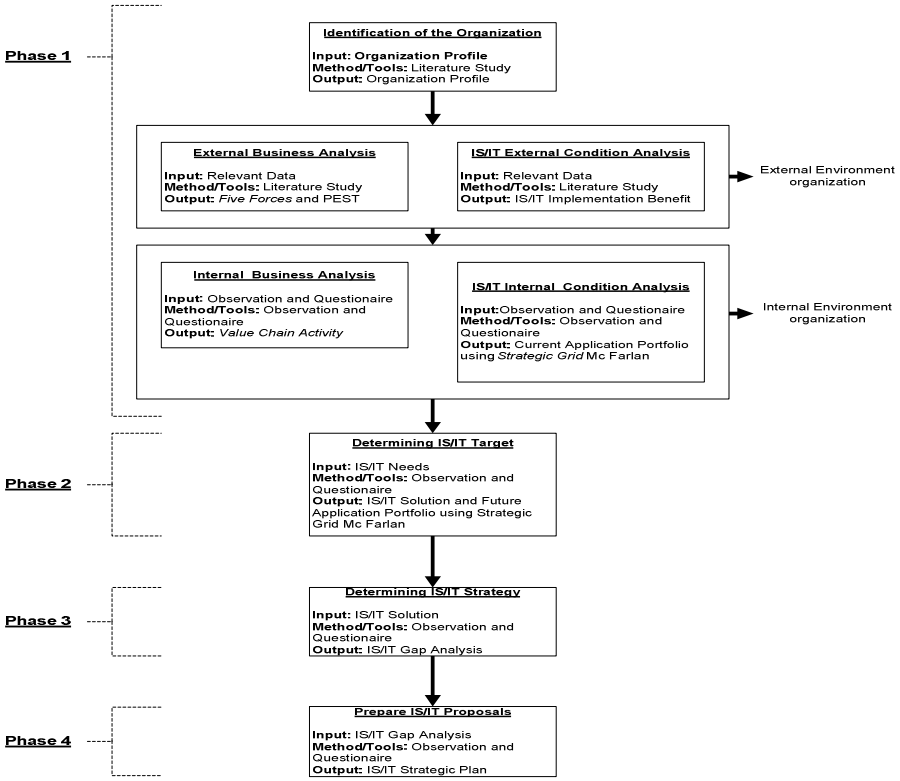

Figure 2. Research Method

The second phase is intended to find the proposed strategy IS/IT that can meet the needs of institution. The results obtained from phase 1 will be input at this stage. The expected result of this second stage is a proposed strategy IS/IT in accordance with the needs of institution. In this study, the proposed strategy IS/IT will be limited to the potential of IS/IT are available at this

time SWCU. In the third phase, will be the strategy IS/IT with respect to the existing policy rules that will be taken against the policy implementation plan IS/ IT in the institution. The next stage after making the planned implementation of IS/IT is to be applied in the institution.

In strategic planning IS/IT based on the methodology used Value Information Systems Strategic Planning (Be Vissta Planning) based on the advantages of strategic planning methodologies of existing information systems (Pavlou, A. P., et. al. 2006). Methodology BVP collects the advantages of information systems strategic planning method of Ward and Peppard, Wetherbe, Martin and Tozer, then compiled into a BVP methodology (Raghunarthan, B., et. al., 1999). The design methodology is based BVP strategic planning activities of IS/IT in some ways, that is based on the organization's business plan document. Each data set forth in the organization's business plan interprets as information needs to be met by field IS/IT division. Field IS/IT division was then conducted an analysis of internal and external conditions in order to determine the ability of its resources and meeting the needs of the business information. The analysis of internal and external systems strategy, management, and information technology are then created for the implementation of priority projects and implementation schedules.

Analysis and Strategic Planning

The first stage of the methodology Be Vissta Planning are reviewing and analyzing the organization's business environment, the activities carried out at this stage are the analysis of an organization's external business environment, the organization's internal business environment analysis, analysis of the condition of IS/IT external conditions and analysis of IS/IT internal institution. Organization's external environment analysis conducted to determine the organization's external environmental conditions, this analysis will be based on assessments of the leaders SWCU to market conditions in the world of education using interview, questionnaire,

and the study of literature on related research. Organization's external environment analysis performed with the aim to identify the needs of IS/IT SWCU so as to compete with its rivals, especially the external conditions. Figure 3 shows the relationship with the organization's external environment analysis of the needs of IS/IT institution.

In this study, the analysis of an organization's external environment is done using two tools which are the analysis of Five Forces and PEST. Five forces analysis using the five forces of external organizations. By using this analysis, it can be identified external things what they are

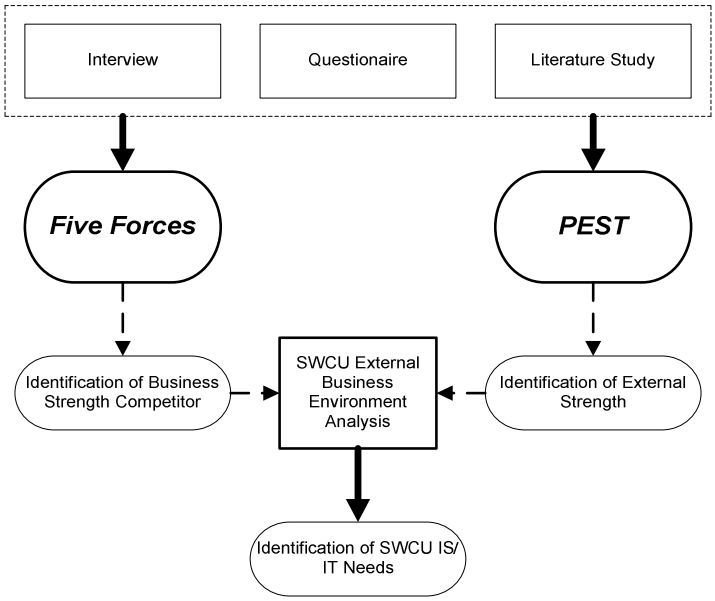

Figure 3. Relationship between Organization's External Environment And IS/IT Instituion Needs

positive or negative that may impact/influence on business processes in the institution. This analysis also aims to provide an overview of solutions IS/IT for the institution. In the analysis of five forces in SWCU very interesting to see who is the customer and suppliers, the customers here are students because they are the users of education services within the institution. While

the supplier is also a student because they are sent to be educate in the university environment to produce output as alumni. For product/service substitutes (subtitute products/services) are different types of services/education services outside the colleges that offer the same learning methods with lower prices and shorter time to produce graduates that can be used by users of raduates. Based on the five forces analysis, it can be mapped to the needs of IS/IT in SWCU, as shown in Table 1.

Table 1. The Need for IS/IT Based on the Five Forces Analysis

Five Forces Factors	IS/IT Needs
A formidable **competitor** that has a complete information system, interesting programs, and the uniqueness of graduates.	- Build a complete information system that integrates all business processes. - Building information systems promotion with attractive multimedia systems.
Threat of New Entrans with various advantages such as business strategies and educational programs webomatrix interesting.	Increase SWCU webomatrix thus becoming one of the world class university that can compete with other universities.
Bargaining Powers of Suppliers and Buyers are able to influence supply, reception, and service to the institution.	Building information systems that can connect between SWCU with stakeholders such as the application of Customer Relationship Management (CRM) and Supply Chain Management (SCM) that can accommodate the demands of stakeholders.
Threat of Subtitute Products/ Services that provide an alternative education program that is relatively cheaper and faster in terms of the study period.	Building information systems that can provide education to stakeholders about the benefits of study at institutions of formal education are much better.

The next external environmental analysis organizations PEST analysis is performed on the four factors that may affect the business processes at the institution. These factors are political, economic, social, and technology. Political factors that some government policies and laws on education. As the university is located in the jurisdiction of the Republic of Indonesia, the SWCU also noticed some laws and administrative regulations governing the implementation of education. Economic factors, among others, economic growth in Indonesia tend to be less

stable that directly affect how the attitude of the parents who would send their children to college. Social factors closely associated with religious and cultural factors. SWCU as one of the university run by a Christian foundation has the feel of a high religious in any activity on campus. However, beside known as a Christian university, the SWCU is also the option for non-Christian students whereas it could be seen from some students who are Muslim, Buddhist, or Hindu. In terms of culture, SWCU known as "Mini Indonesia" which can be viewed from various ethnic diversity of the indigenous or ethnic culture from Sabang to Merauke, barely contained in the institution. This suggests that the lost password can be accepted by all societies and ethnic cultures as a college that has good quality. Technology factors, namely, the use of technology is used ranging from administration to teaching and learning, even when it lost password using technology in terms of promotions and new admissions as a test online and announcement of test results. Development web 2.0 technologies such as network infrastructure and influence how business processes are performed in the institution. If the first, each business unit using technology separately with each information system, currently all business units in lost password associated with the integrated information system. Based on PEST analysis, it can be mapped to the needs of IS/IT in SWCU, as shown in Table 2.

While the environmental analysis IS/IT external organization aims to see the development of the condition of IS/IT today that will affect the implementation of IS/IT in the institution. In conducting this analysis, the researchers conducted a study of literature from various sources which will see the various developments of IS/IT such as: development IS/IT for higher education, software development, hardware development, development of database systems, development of communication network and data security, and the development of social networking media (social network) that will be able to see the benefits of the implementation of

Table 2. The Need for IS/IT Based on the PEST Analysis

PEST Factors	IS/IT Needs
Politics: Government policies, laws, and laws and regulations on education through the Higher Education and Kopertis region VI of academic quality control and program evaluation studies.	- Building information systems that can carry out supervision of academic quality. - Build a system which can provide reporting information related to the process of accreditation of courses and extension of the operational program of study based on self-evaluation program of study.
Economics: Purchasing power of prospective students to the study plan is relatively low due to the economic conditions are less stable and thus require colleges to study low cost, easily accessible location, and has a scholarship.	Building information systems that can provide information about tuition fees, college location, and complete scholarship information.
Social: Religious diversity and ethnic cultures throughout Indonesia that make the campus lost password "Mini Indonesia" provides its own characteristics compared to other colleges.	Building information systems that can provide information about the diversity of socio-cultural that can be accessed by the general public so as to attract potential students from diverse backgrounds in the area of Indonesia.
Technology: Development technology and integrated information systems have an impact on the entire organization's business processes.	Provision of adequate technology infrastructure so as to support the implementation of information systems at the institution.

IS/IT in the institution. Based on the analysis of external conditions IS/IT, it can be identified several benefits of the implementation of IS/IT in SWCU as shown in Table 3.

The next stage of analysis is the organization's internal business environment analysis was made to have a clear business processes that occur in the SWCU in order to obtain a clear picture of the strategic plan IS/IT to meet the needs of the organization. Analysis process is to conduct interviews and questionnaires to the various business units of organizations including the heads of institution. Analysis tool is the organization's internal business environment using the Value Chain Activity. Value chain analysis of activity undertaken to describe the activity of

Table 3. Benefits from Applying IS/IT Based on the IS/IT External Conditions

IS/IT External Condition	Benefits from applying IS/IT
- The use of information systems for business processes at the college began to demand. - The continued development of open source software. - The development of technology based on Service Oriented Architecture (SOA) for web applications. - Internet broadband mobile technology is increasingly used in computer networks. - Data security system start being applied in various information systems. - The development of social networking media along with the increasing use of smartphones.	- Facilitate the organization's activities and business processes for integration of all business units within an information system. - Reduce operating costs and maintenance of information systems. - Facilitate the distribution of data and information from each business unit are related and interconnected with information systems. - Facilitate the communication of data and information remotely and improve the efficiency of time and place. - Provides data integrity and security hardware used. - Facilitate the promotion and management of the academic community.

key business processes and supporting business processes of an organization. This analysis also aims to identify and classify the activities that occur in SWCU into two major parts which are the major activities and support activities. The results of this analysis will then be used to identify the needs of IS/IT. Value chain activity that occurs in SWCU can be described as in Figure 4.

In identifying the application of IS/IT in SWCU, they conduct the environmental analysis IS/IT internally in SWCU to all available resources IS/IT. Resource in question is information systems, information technology, and human resources or management IS/IT contained in the institution.

The next stage after an analysis of business and IS/IT organization's external and internal, that is the proposed solution strategy IS/IT which can meet the needs of IS/IT in the institution. The results obtained from previous stages of environmental analysis and business IS/IT

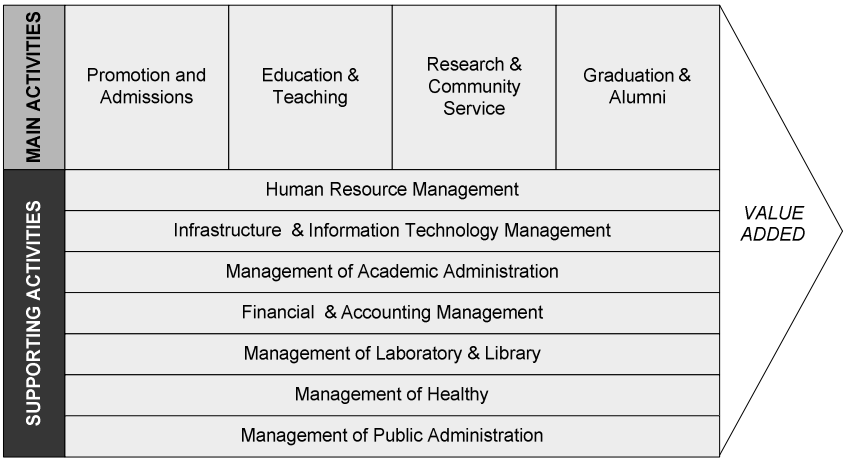

Figure 4. SWCU Value Chain Activity

organizations will be input at this stage of the solution strategy proposed IS/IT. Then, applications will be mapped according to their respective functions using the matrix Mc Farlan Strategic Grid (Raghunarthan, B., et. al., 1999) to determine the priority application to be applied in future SWCU. Future applications of mapping matrix can be seen in Figure 5.

Strategic	***High Potential***
- Web Promotion - Promotion - Research - Community Service - Career Center	- CRM - SCM - Evaluation of Learning - Performance Assessment Lecturer - Evaluation of Students - Alumni Evaluation - Learning Control
- Accreditation and Reporting EPSBED - Admissions - Workload Lecturer	- Online Tests - Multimedia FLearn - Libraries - Graduation - Alumni - Human Resources Management - Infrastructure Management - Management of Information Technology - General Administration
Key Operational	***Support***

Figure 5. SWCU Future Applications Portfolio Strategic Grid

Based on the applications that have been proposed and mapped in Figure 5, then made a plan implementation IS/IT to create a roadmap of priorities that takes into account factors of resources, functions, and complexity of applications that will be implemented in the future. Priority implementation will be based on the quadrant of Mc Farlan Strategic Grid:

1. Priority #1: Applications that are in key operational quadrant.
2. Priority #2: Applications residing in quadrant support.
3. Priority #3: Applications in the strategic quadrant.
4. Priority #4: Applications that are in the quadrant of high potential.

Summary

Analytical results obtained in this study illustrate that the application of IS/IT which done in SWCU is unable to support the overall business process. The analysis was done to the environment and environmental business IS/IT external and internal in order to identify the needs of IS/IT to support business processes at the institution. Solution strategy IS/IT focused arranged to support the main activity in SWCU, such as promotions and new admissions, education and teaching, research and community service, as well as graduation and alumni. Another strategy is to give the proposed solutions of IS/IT supports to sustain the various activities that support the main activity, such as: managing human resources, facilities and information technology, academic administration, finance and accounting, laboratories and libraries, and public polyclinics in order organizations gain a competitive advantage. BVP application of the methodology in the preparation of strategic planning IS/IT in SWCU provide alignment between IS/IT with the vision, mission and goals of the organization as a portfolio of solutions IS/IT based on the results of the study and analysis of the primary activities and support activities that are identified using a value chain activity.

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THE STUDY OF MANAGEMENT CONTROL SYSTEMS IN STATE OWNED ENTERPRISES: A PROPOSED CONCEPTUAL FRAMEWORK

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Abstract

This proposed conceptual framework is intended to define the scope and formulate the conceptual framework and relevant variables for a further comprehensive study. The objectives of the study will be: (1) to investigate the relationship between the management control system (MCS) in relation to the effectiveness of organizational strategy implementation; (2) to investigate what are the critical success factors (CSFs) within the MCS and the effectiveness of organizational strategy implementation; and (3) to use the research findings for formulating a more appropriate model for highly effective organizational strategy implementation within the MCS. In order to achieve the given objectives, the investigators use an interdisciplinary approach to formulate the conceptual framework. Primary data will be collected by: (1) in-depth interview of experts in the area of MCS in order to obtain opinions and recommendations for improving the conceptual framework and related variables for statistical analysis; (2) a structured questionnaire schedule for management personnel relevant to MCS at three levels: (i) high ranking, (ii) middle ranking, and (iii) lower ranking management or supervisors, in order to obtain data for statistical analysis to test the given hypothesis. Secondary data will be collected from previous research findings especially findings closely related to MCS in Thai state-owned enterprises in order to compare the present with the previous research findings. Regarding data analysis, triangulation techniques will be used to test validity and reliability of the findings.

Keywords: management control system (MCS), organizational strategy effectiveness (OSE), critical success factors (CSFs), conceptual framework, state-owned enterprises

Introduction

The rationale and justification for the study of management control systems (MCS) in relation to organizational strategy effectiveness (OSE) in state-owned enterprises are as follows: (1) it is believed that there is a relationship between MCS and OSE. (2) The opinions and recommendations from personnel in state-owned enterprises will help to formulate suitable critical success factors (CSFs) to help develop a more effective MCS model, which will later on lead to effective organizational strategy implementation. (3) Before undertaking a comprehensive study of a project of this kind, it is believed that a pilot study to define the scope and to formulate the conceptual framework and relevant variables for a further comprehensive study will help such a further comprehensive study to achieve a higher quality. This is because so far there are insufficient research findings to establish a relationship between MCS and OSE. However, there are some previous research findings relevant to the given topic of study. The literature review will help to pave the way to an appropriate proposed conceptual framework for the study of MCS in relation to OSE.

Broadly, MCS comprise all those processes and procedures by which managers are to ensure that the organizational strategies are implemented and their objectives achieved. However, in management literature, MCS are defined in different ways by different people, both researchers and practitioners.

The way MCS are defined, or in other words, the meaning of MCS, affects the design and implementation of MCS in an organization. However MCS are defined, the aim of an organization is to provide a basic and relatively stable framework of organizational structure and mechanisms. It is within this framework that the management control system functions and by which it is to a certain extent constrained. It is the thesis of this article that the interaction

between MCS and this organizational framework has an impact on the effectiveness of implementation of organizational strategy. The aim of MCS in an organization is to ensure the strategy is implemented and the resources are used in ways to obtain the organization's goals and objectives efficiently and effectively. It is believed that if previous research findings are carefully and systematically studied, they will help support a more appropriate conceptual framework for the study of MCS in relation to organizational strategy effectiveness.

Regarding MCS, Anthony and Govindarajan (2007) define management control as "the process by which the manager influences other members of the organization to implement the organization's strategy." Hence there is a definite implication that control is primarily over employee attitudes and behavior. With this in mind, the management will take into consideration all aspects of the organization's context and environment: (1) organizational objectives and goals, (2) strategy planning and implementation, (3) organizational systems, processes and procedures, (4) organizational structure (5) efficiency and effectiveness, (6) organizational behavior and culture, (7) data and information, (8) resources, and (9) the changing business environment.

This article is concerned with management control systems in state-owned enterprises especially those in Thailand. Every state-owned enterprise has to use the criteria and standards of Thailand's State Enterprise Policy Office (SEPO) for its annual performance evaluation. A State Enterprise Performance Appraisal Committee was first established in 1995. In 2004, the State Enterprise Policy Office (SEPO) proposed assessment criteria for organizational management in order to bring management practices into line with global standards. In 2007 the appraisal system was upgraded so as to be consonant with the direction of national development and as a means to promote genuine excellence of performance among state enterprises. A Subcommittee was

appointed to improve the work performance appraisal system. The Subcommittee in turn proposed the use of a Self-Assessment Report (SAR) and criteria for a Thailand Quality Award (TQA). The new system came into operation in 2008, under the name of State Enterprise Performance Appraisal (SEPA).

SEPO has issued a structured evaluation system which formulates "performance agreements," which are agreements between the government and each state-owned enterprise that specifies the latter's performance appraisal criteria and objectives for each year. The agreement also identifies the rights and responsibilities of both parties. The negotiation between the two parties to reach the performance agreement is free and fair. Consequently, the state enterprise performance appraisal will be governed only by the state enterprise's executive officers. To ensure that the performance appraisals of the various state enterprises coincide, and those in a similar business environment are comparable to one another, state enterprises are categorized into various sectors. The State Enterprise Performance Appraisal Committee subsequently appoints a board of the State Enterprise Performance Agreement and Appraisal Subcommittee for each sector. The development of the performance agreement comprises three key steps as follows:

Step 1: Identifying the Performance Criteria. The present performance appraisal system specifies criteria that are used for assessing state enterprise operational efficiency in the following three key areas: 1) Adherence to policy; 2) Operating performance 2.1) Financial, 2.2) Non-financial; 3) Organizational management, 3.1) Management role of board of directors, 3.2) Risk management, 3.3) Internal control and audit, 3.4) IT management and 3.5) Human resource management. For state enterprises that are listed on the Stock Exchange of Thailand (SET) and subject to legal requirements under SET regulations and procedures, the following rules are

applicable to the development of their performance agreements. *1) Listed State Enterprises***.** The Ministry of Finance will assess the performance of listed state enterprises by defining objectives and key performance indicators, both financial and non-financial. The key performance indicators are primarily of business and industry standards. The corporate governance rating will also be determined. *2) Non-Listed State Enterprises*. The Ministry of Finance will apply the abovementioned performance appraisal system that focuses on three key areas.

Step 2: Defining Criterion Weight. The performance criteria, typically not more than 10 in number, are of varied relevance to operational performance. Therefore, they must be assigned different criterion weights; the relatively more important criteria will be assigned a greater weight. By defining the criterion weight, the state enterprise executives can manage the organization to meet the government's requirements. In this regard, the commercial state enterprises will be more profit-orientated than those that provide public utilities and public facilities. The latter must consider other operational aspects especially service quality. Details of the criterion weights are as follows:

1) Adherence to policy (20-30%), 2) Performance of the state enterprise (40-50%), 3) Organizational management (30%).

Step 3: Defining Performance Targets for Each Criterion. For each criterion, performance results are classified into five levels: Level 5 exceeds the set target in the annual enterprise plan (level 3). Only state enterprises with outstanding management can achieve level 5. Level 1 is a result that is considerably lower than the set target in the annual enterprise plan (level 3). When determining performance targets in each year, the government representatives use the past performance as the basis for comparison with the private sector's standards and international standards. This is to induce state enterprises to improve their operational performance and to be

on a par with the private sector. Even though the improvement of a state enterprise's standards may not be achieved within one year, setting the targets higher every year can encourage them to operate more efficiently.

State Enterprise	Performance Criteria/Criterion Weights
1. Listed State Enterprises	• Operational performance 70% • Organisational management 30%
2. Non-listed State Enterprises	• Adherence to policy 20% (±10) • Operational performance 50% (± 10) • Organisational management 30%

Performance Appraisal System Procedures comprise the following steps: *Step 1*: A state enterprise submits its business/ strategic/ enterprise plan to SEPO after receiving its board of directors' and the line ministry's approval. *Step 2*: The Subcommittee, Ministry of Finance (SEPO), the State Enterprise Efficiency Improvement Committee and related agencies jointly review the business/ strategic/ enterprise plan in order to define performance indicators, criterion weights and targets. *Step 3*: The Ministry of Finance (SEPO) informs the state enterprise of the agreed key performance indicators, criterion weights and targets so that the performance agreement can be written. *Step 4:* The state enterprise presents quarterly and annual reports to SEPO and the State Enterprise Efficiency Improvement Committee. *Step 5:* The State Enterprise Performance Appraisal Committee acknowledges the state enterprise's operating performance at the first half and accounting year-end. *Step 6*: The annual report of the state enterprise's operating performance is submitted to the Cabinet. Regarding the background of the above performance appraisal system, state enterprises are organizations with imperative roles in the country's development. They are tools for implementing state policies: developing the public service system, boosting the country's economy, generating national income, and improving the

well-being of people in the country. By recognizing the importance of state enterprises, the Ministry of Finance aims to develop their organizational management system and raise their operational efficiency to international standards so that they are prepared for global competition and dynamic change. In 1995 the Cabinet resolved on application of the state enterprise performance appraisal system to monitor their operational efficiency. The performance appraisal system is related to the incentive systems for the employees. The system was first adopted in 1996 and gradually extended to various state enterprises; 52 state enterprises have currently adopted the system. In 2004, performance criteria for organizational management were laid down to induce state enterprises to further develop their organizational management system and be on a par with international standards. Five areas of organizational management are therefore identified as core topics for performance appraisal: 1. Role of board of directors, 2. Risk management, 3. Internal control and audit, 4. IT management, 5. Human resource management. The State Enterprise Performance Appraisal Committee was appointed to be responsible for assessing the performance of state enterprises.

The state-owned enterprises differ in significant ways from publicly traded and privately owned companies, and are apt to have problems of efficiency that good governance may remedy. Sokol (2009), albeit with the US context in mind, quotes the World Bank definition of a state-owned enterprise (SOE) as a "government-owned or government controlled economic entity that generates the bulk of its revenues from selling goods and services." They form an important part of the global economy; but studies suggest that they tend to be less efficient than analogous private companies, because of lack of incentives associated with government ownership, and are associated with lower economic growth in developing countries. SOEs differ from private firms in that their goal is not necessarily profit maximization. It is believed that if the experience of

management control systems in Thailand could be incorporated with the experience of management control systems abroad, a better and more appropriate model for a management control system would be obtained.

The objectives of this study are: (1) To review literature on aspects of management control systems in relation to organizational strategy effectiveness on the basis of both the theoretical framework and empirical research and studies. (2) To study the appropriate critical success factors in support of MCS to accomplish organizational strategy effectiveness.

Literature Review

In order to understand and be able to more effectively apply the proposed conceptual framework in comprehensive research, the proposed five keywords or key phrases should be reviewed. If possible, previous research findings in the area of MCS in relation to Thailand's state-owned enterprises and organizational strategy effectiveness should be studied. In addition, the Balanced Scorecard (BSC), Results-based Management (RBM) and Total Quality Management (TQM) as supportive techniques should be incorporated into the conceptual framework. The review of relevant previous research findings follows the keywords or key phrases as follows:

(1) Management control system (MCS), in the context of this proposed conceptual framework, involves the critical success factors for organizational strategy effectiveness. In the literature, MCS have been studied on many dimensions by many researchers. However, the literature review on MCS in this context will emphasize the relevance of the MCS to organizational strategy effectiveness.

Regarding the previous studies of management control systems, the objective of this investigation is to study the relationship between management control systems and the efficiency

of implementation of organizational strategy. The question here is: How does a management control system control? Many models have been proposed as to how management exerts control. Control may be formal, based on adherence to standardized rules and procedures, and monitoring of output in order to take corrective action whenever this deviates from a specified standard; or informal, based on unwritten policies which are part of organizational culture or on shared values of organizational members (Langfield-Smith, 1997; Otley, 1999; Ouchi, 1979).

Simons (1995, 2000) proposed four Levers of Control (LOC): (1) a Belief System, regarding the basic values and purposes, which senior management systematically reinforces, (2) a Boundary System which delineates high-risk activities to be avoided, (3) a Diagnostic System, which reports on critical success factors and enables employees to perform in accordance with organizational objectives, and (4) an information-based Interactive System, which enables the organization to search for innovative strategies in a changing market environment.

Pock (2007; see also Clenhall, 2003) proposed three dimensions of control. Organic control is flexible and involves few formal rules. It emphasizes changing, non-standard information and freedom of employees as to how they handle their respective tasks. Mechanistic control requires standardized procedures, allowing advanced statistical control information and feedback. It emphasizes efficiency of control (Simons, 1995). Thirdly, Pock draws attention to the increasing importance to management for improved performance of non-financial data of the kind that the Balanced Scorecard is intended to capture.

Kloot (1997) drew attention to the Cybernetic model of a management control system. This is possible when there is a means of measuring output, comparing this with a set objective and providing feedback so that corrective action can be taken when the output deviates from the

objective. A Non-Cybernetic control system exists when this is not possible, which is likely to be the case in a highly dynamic or chaotic environment.

(2) Organizational strategy effectiveness (OSE), in the context of this proposed conceptual framework, comprises many relevant factors. According to Deming (1986), there are at least four stages of the management cycle to support the effectiveness of organizational management, that is: (i) Plan stage or using appropriate CSF-supported MCS to formulate an appropriate organizational strategic plan, (ii) Do stage or using appropriate CSF-supported MCS to implement the so formulated plan, (iii) Check stage or using appropriate CSF-supported MCS to monitor and evaluate the performance of the plan implementation through a set of "public service agreements" (PSA) between Thailand's state enterprises and the government agency who has and uses a mandate to control these state enterprises, and (iv) Act stage or using appropriate CSF-supported MCS to standardize the existing target according to the KPIs and criteria as mutually agreed between the Thailand state enterprises and the mandated controlling agency. Based upon the two main variables, that is MCS and OSE, there are at least three other main variables playing their roles in supporting the effectiveness of the organizational strategy. These are the Balanced Scorecard (BSC), Results-based Management (RBM) and Total Quality Management (TQM).

(3) Critical Success Factors (CSFs) of organizational strategy effectiveness in state-owned enterprises are interesting. Basically, CSFs for effectiveness of any organizational strategy are based on more than one factor.

Critical success factors (CSFs) first came into prominence when it was proposed that there are certain factors that, if not achieved within an organization, will cause the organization to fail (Pettit and Beresford, 2009). CSFs have been defined as "the limited number of areas in

which results, if they are satisfactory, will ensure successful competitive performance for the organization," and as "those variables which management can influence through its decisions" and which impact a company's overall competitiveness. Then again, CSFs are the characteristic conditions or variables that, when properly sustained, maintained or managed can have a significant impact on the success of a company in a particular industry, or they are the "limited number of areas in which results ensure successful competitive performance" (quoted by Pettit and Beresford, 2009).

For example Chin, Chan and Lam (2008), in the context of Hong Kong manufacturing industry, consider the possibility of "coopetition," that firms can simultaneously compete and cooperate, in the same or different areas, to mutual advantage. They define the following levels or categories where effective and efficient implementation is required: (1) Management commitment, comprising (1.1) management leadership, (1.2) long term commitment, (1.3) organizational learning, (2) Relationship development, comprising (2.1) development of trust, (2.2) knowledge and risk sharing, and (3) Communication management, comprising (3.1) information system support, and (3.2) a conflict management system. Each factor is divisible into several subcategories. Where competition is high, the authors place the highest priority on management commitment and leadership.

Metri (2005) considers CSFs for Total Quality Management (TQM), a topic that will be examined in more detail below. Metri proposes 10 areas for CSFs: top management commitment, quality culture, strategic quality management, design quality management, process management, supplier quality management, education and training, empowerment and involvement, information and analysis, and customer satisfaction.

The emphasis on top management commitment should be noted. This includes the use of effective management technologies and management control systems, and high quality of human resources.

(4) Balanced Scorecard (BSC) helps support organizational strategy effectiveness in the sense that organizations which pay attention just to a limited dimension of management, such as to the financial dimension alone, will find it hard for their organization to succeed. The Balanced Scorecard (BSC) was introduced by Kaplan and Norton (1996) in recognition of the fact that organizational performance cannot adequately be measured in terms of financial factors alone, and has become one of the most effective techniques in support of managerial control. The Balanced Scorecard in their definition means that the organizational strategic plan should cover the dimensions not only of finance but also the customer, internal business performance, and learning and growth dimensions. The BSC in general evaluates performance in terms of four distinct perspectives, for each of which a set of appropriate key performance indicators is defined: (1) financial perspective, (2) customer perspective, (3) internal business process perspective, and (4) learning and growth perspective. Other areas of management may be considered, depending on the particular nature of the organization concerned. The BSC enables managers to assess how well organizational strategies are being implemented and strategic goals achieved.

The BSC is discussed by Armesti, Salarzehi and Kord (2010), who emphasize that modern MCS must encourage employee creativity and innovativeness. The implementation of a successful BSC is not simple. Systems must be designed for collecting non-financial information, commitment and support is needed at every level of the organization, organization

culture needs to change, and the BSC must be designed to meet the specific requirements of each organization.

Da Fonseca (2010) also mentions cultural factors that may affect the design of the BSC. Managerial assumptions that originated in a North American/European background may need to be modified when transplanted into a different cultural context. Da Fonseca suggests in-depth interviews that would explore not only the informant's point of view, but the importance that the informant attaches to the issues being discussed.

This theme is taken up by El-Gammal (2012), comparing the use of MCS among German, French, Japanese and Italian car manufacturing firms based in Egypt with that of a purely Egyptian company. The study showed only a minimal tendency for foreign firms to adjust their practices to accord with those of the Egyptian company. Several explanations were suggested for this unexpected result. The matter of the relationship of national culture to corporate practice is clearly complex and calls for more research into this interesting question.

(5) Results-based Management (RBM) helps support organizational strategy effectiveness in the sense that, in organizational strategy implementation, there should be results at different levels of goals. In practice, organizational strategy implementation must be supported by RBM, that is RBM in fact plays a significant role in giving targeted results at various levels of successful organizational strategy implementation. These are the results for overall strategy outcomes, the results at each strategy outcome, and the results at the level of project or action plan outcome. Regarding the results at project level, logical framework analysis (LFA) derived key performance indicators (KPIs) are useful for better understanding of KPIs at sub-levels in the project. These are: (i) KPIs at project input or project resource level; (ii) KPIs at process level; (iii) KPIs at output level; and (iv) KPIs at outcome level. Additionally, project results have

become sustainable, that is the project outcome has been maintained and developed continuously by the beneficiaries. In the context of organizational strategy effectiveness, the potential organization executives usually pay attention not only to effectiveness but also to the sustainability of effectiveness.

Results-based Management (RBM) directs attention to the outcomes of managerial or employee action. It is of interest in the present context because it has been widely adopted into public sector management, at least in the USA, and the US experience may help to provide guidelines to its adoption in state-owned enterprises in Thailand.

Swiss (2005) provides a simple model to explain the success or failure of Results-based Management efforts. Three components are essential. Firstly, there is information: There must be means for identifying and accurately measuring programme outcomes and how organizational goals are being achieved. Secondly, granted that there is information managers and employees must have the capacity that is the education, autonomy, and means to act on it. Thirdly, managers and employees must have sufficient incentive to use their capacity and act on information. This problem may be particularly severe with government agencies which tend to lack the more obvious incentives such as profit and competitiveness. Swiss considers at length the problem of building adequate incentives into public sector employment.

Patanapongse (2011) compares the use of RBM, as between the United Nations Development Programme (UNDP) and a Thai government agency, at project level in Thailand. Both organizations used KPIs at the project planning and management stages. The UNDP had the advantage in its much more effective use of stakeholder participation at all stages.

(6) Total Quality Management (TQM)

Zakaria and Zulnaidi (2006) define Total Quality Management (TQM) as "a set of quality management actions or critical factors that [are] practiced by an organization for the achievement of excellent organizational performance." Though quality management has become recognized as one of the essential factors leading to organizational growth, success and competitiveness and many organizations have attempted to implement TQM systems, the results have been inconsistent. Much seems to depend on just how TQM is implemented and monitored.

TQM requires an often radical change to a culture of quality. Abraham, Crawford and Fisher (1999) studied 14 companies winning the Australian Quality Award and concluded that successful companies were those that could manage a process of complex organizational change. The critical factor leading to successful implementation of a TQM system was found to be active management support for the change – though clarity of vision, participation, cultural communication and resource support were also important.

Metri (2005) studied the construction industry, which has been notably slow in adopting TQM and has been plagued by low productivity, poor quality and lack of customer satisfaction, with a view to developing critical success factors (CSFs) for TQM in construction firms. The author examined 14 frameworks for the adoption of TQM and arrived at 10 basic critical success factors for construction quality management (1) Top management commitment, (2) Quality culture, (3) Strategic quality management, (4) Design quality management, (5) Process management, (6) Supplier quality management, (7) Education and training, (8) Empowerment and involvement, (9) Information and analysis, and (10) Customer satisfaction. These are evidently capable of wider application.

Zakaria and Zulnaidi (2006) concluded that the proper implementation of TQM requires an appropriate monitoring and control process. They likewise identify 10 critical success factors

for the implementation of TQM: (1) Top management commitment, (2) Strategic planning, (3) Customer focus, (4) Benchmarking, (5) Human resource management, (6) Supplier relationships, (7) Continuous improvement, (8) Quality information system, (9) Service design, and (10) Social responsibility. The general agreement among authors on the importance of managerial commitment and support is noteworthy.

Research Methodology

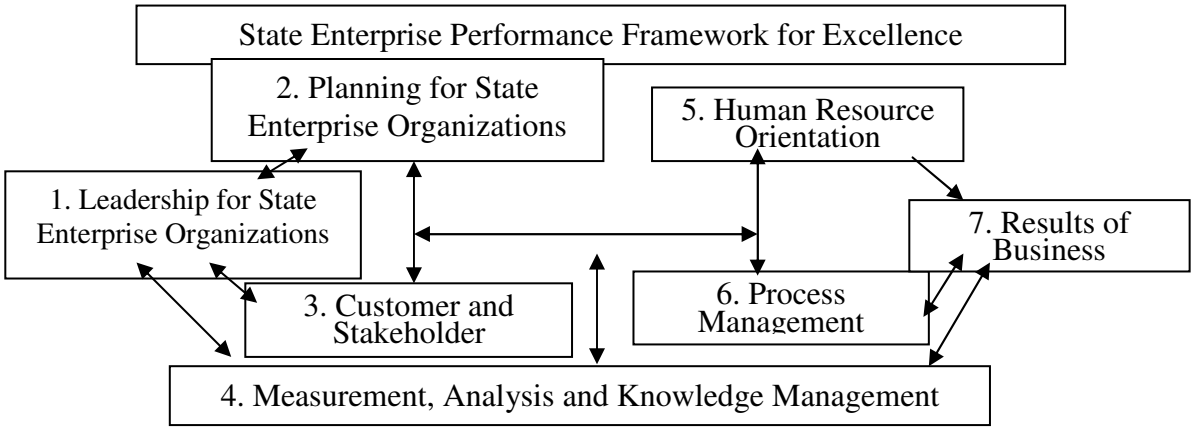
The Conceptual Framework

The conceptual framework (See Figure 1.) will be formulated on the basis of the experience of state-owned enterprises in Thailand which use State Enterprise Policy Office or SEPO criteria and standards for their management control. As a result, the conceptual framework for this research will be derived from both a theoretical background and the experience of using SEPO criteria and standards for management control of the state-owned enterprises in Thailand.

There are at least 55 state enterprises that play a significant role in the economic and social development of Thailand. All of these Enterprises have to use State Enterprise Performance Appraisal (SEPA) techniques for evaluation. SEPA has been developed from the Malcolm Baldrige National Quality Award (MBNQA). SEPA and RBM are more or less the same because both aim at results achievement. SEPA can be incorporated with other techniques such as BSC and TQM. Moreover, it can be incorporated with criteria and standards which have to be implemented in order to follow government and SEPO policies.

The ways in which management control systems influence the formulation and implementation of organizational strategy are complex. For the purpose of this research, the proposed conceptual framework is illustrated in Figure 2 below.

Figure 1. Conceptual Framework for State Enterprise Performance Appraisal

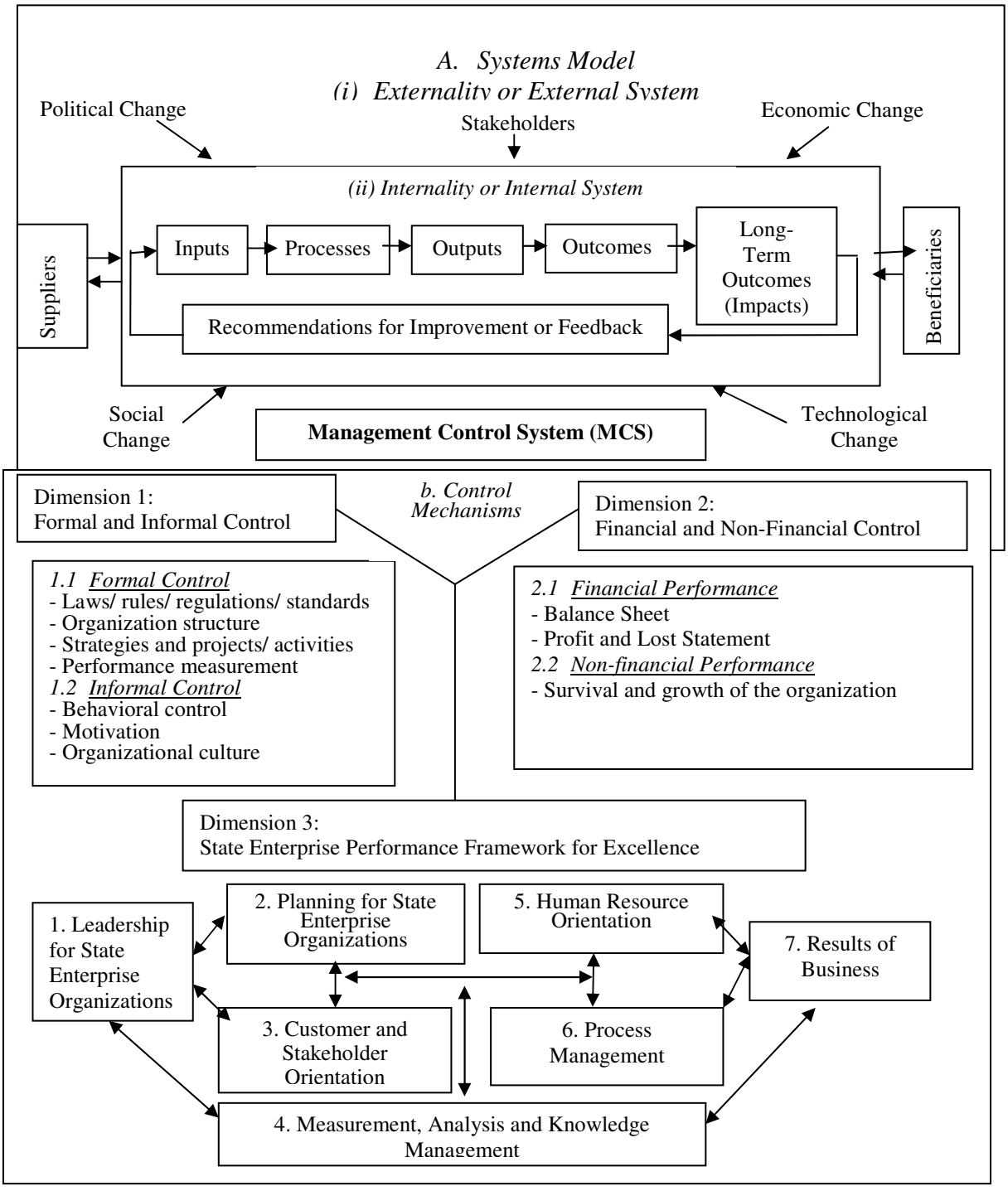


According to the above Figure 2, in driving organizational strategy for organizational effectiveness, there are three basic components to understand.

First, a Systems Model, which comprises two sub-categories, that is to say, (i) Externality or External system and (ii) Internality or Internal system.

(i) Externality or external system: A management control system has something to do with the external system because environmental changes such as political, economic, social and technological changes both directly and indirectly affect organizational effectiveness. Thailand's state-owned enterprises have to align their organizational policy with the government's policy while they have to adjust their policy towards economic change. In addition, a state-owned enterprise has to adjust itself towards public needs. That is, Thailand's state enterprises have a duty to create what Mark Moore called "public value" or value that can satisfy public expectations (Moore, 1995). Additionally, a state-owned enterprise, like a standard organization, has to be responsive to technological change. Appropriate innovative technologies must be adopted and adapted to strengthen organizational effectiveness. Information and

Figure 2. Proposed Conceptual Framework for a Management Control System for State-owned Enterprises



knowledge on the external system helps management to adapt rather than to control. Responsible organizations should follow what Darwin said "It is not the strongest of the species that survives, nor the most intelligent that survives. It is the one that is the most adaptable to change."

(ii) Internality or internal system: A management control system (MCS) is based upon controllable variables which are mainly the components of the internal system. Figure 1 above shows a Results-based Management (RBM) control system. In fact, RBM is derived and developed from a systems model which originally comprised at least the following components: inputs, processes, outputs and feedback. Later on, RBM developed so as to be more concrete and measurable. As a result, each component within RBM such as Inputs, Processes, Outputs, Outcomes and Long-term Outcomes (Impacts) can be divided into sub-components and key performance indicators (KPIs) can be created for further measurement. In using the internal system, in addition to the KPIs at the Inputs level, KPIs at the Processes level, KPIs at the Outputs level, KPIs at the Outcomes level, and KPIs at the Long-term Outcomes (Impacts) level, which will be obtained from both factual data and opinion data given by the relevant personnel of the organization, suggestions for improvement or feedback from the relevant persons as to more effective management control should be collected.

Second, Control Mechanisms: In addition to using a systems model to create KPIs for assessing the effectiveness of the MCS of the organization, it is suggested that both data on "*Formal and*

Informal Control" and "*Financial and Non-Financial Control*" should be collected. Regarding "*Formal Control*," appropriate and applicable laws, rules, regulations and standards of the organization should be revised as to be suited to both the external and internal environment of the organization. In addition, organization structure should be revised so as to be suited to the changing environment. A strategic plan and action plan with appropriate performance measurements should be formulated periodically or at least once every five years. Regarding "*Informal Control*," organizational culture should be revised so as to be suited to the changing environment. In addition, appropriate motivation and incentives should be used as a measurement for the effectiveness of MCS of the organization. In order to be highly effective in MCS, a training curriculum on attitudes towards colleagues at the workplace and better attitudes towards the organization should be developed to be suited to the changing environment. This is because if the personnel of the organization have positive attitudes towards their colleagues and their organization, it will be easier to attain better management control.

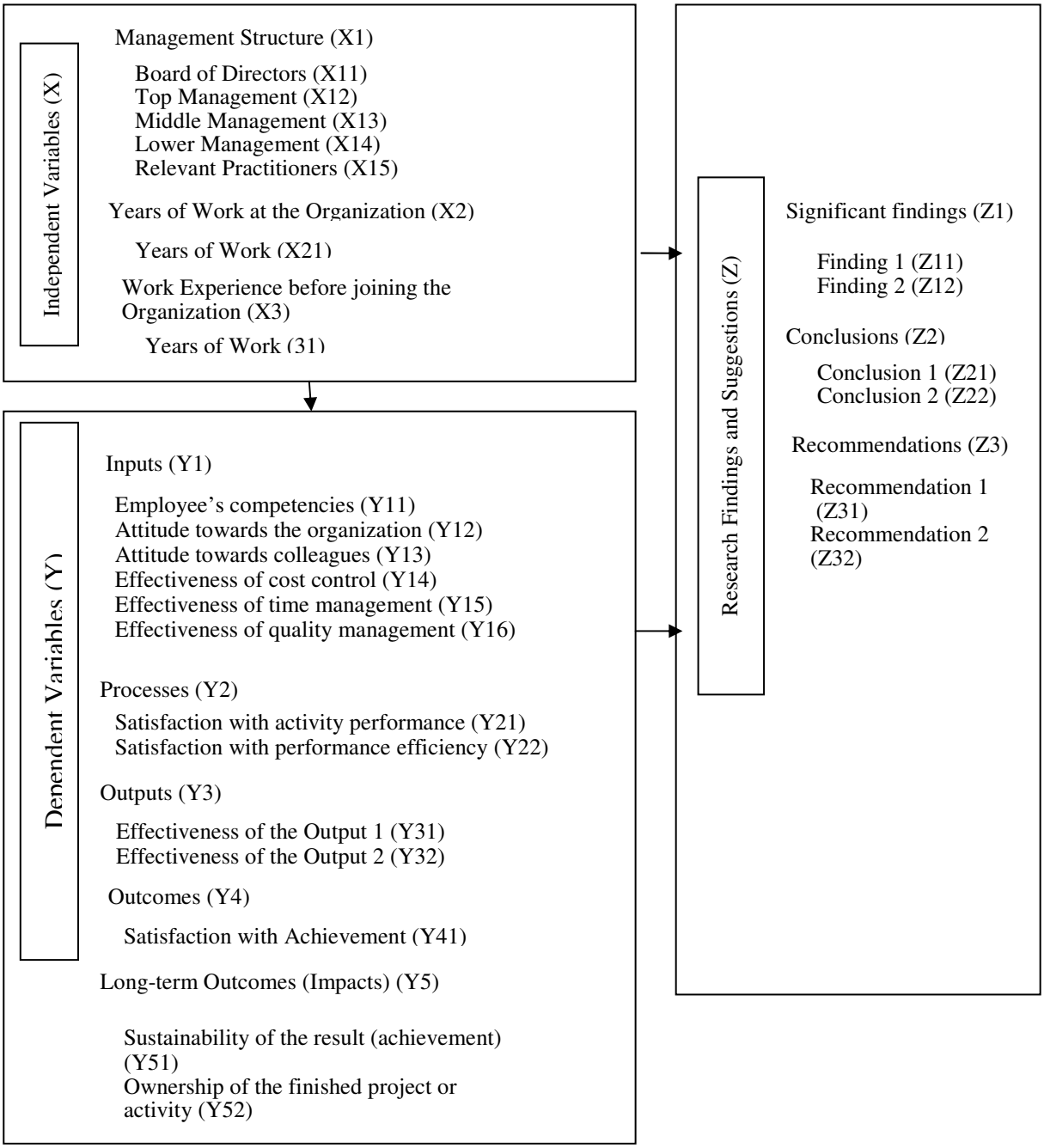
Third, a State Enterprise Performance Framework for Excellence, which is derived from the Malcolm Baldrige National Quality Award criteria and used as a foundation for management control systems in all state-owned enterprises in Thailand. All seven components of the framework, namely (1) Leadership for State Enterprise Organizations, (2) Planning for State Enterprise Organizations, (3) Customer and Stakeholder Orientation, (4) Measurement, Analysis

and Knowledge Management, (5) Human Resource Orientation, (6) Process Management, and (7) Results of Business, are used to formulate key performance indicators (KPIs) for evaluation. To implement an MCS, one can further design the conceptual framework for statistical analysis as in the following Figure 3.

Figure 3 below shows the relationships among Independent Variables (X) and Dependent Variables (Y) which can be regarded as *"Driving Components*" with Outputs, Outcomes and Long-term Outcomes (Impacts) which can be regarded as "*Development Component*s." The purpose of the MCS is to help drive organizational strategies so as to be highly effective. Additionally, the MCS aims to reach its destination that is to help the organizational strategy team to reach their maximum target, the Long-term Outcomes (Impacts) or sustainability of the success obtained.

In order to assure the effectiveness of the MCS tool, it is recommended that the organizational strategy management team should embrace a "control mechanism." In Figure 2, three dimensions are given as guidelines to its components, that is (1) Formal and Informal Control for Dimension 1, (2) Financial and Non-financial Control for Dimension 2, and (3) State Enterprise Performance Framework for Excellence for Dimension 3.

Figure 3. Proposed MCS-based Conceptual Framework for Statistical Analysis



As regards Dimension 1, Formal Control should be based on "participation" and "ownership." This means all relevant people in the organization should have the opportunity to take part in MCS activity. If possible, this should be developed until all participants feel they are the owners of the activity or project they participate in. The tactic of motivating organizational people to have the opportunity and to feel they are owners of an activity can help strengthen the

MCS. Without participation and ownership, it will be difficult to drive the MCS so as to be effective.

Cunningham (1992), concerned that in many US companies MCS and supporting accounting systems did not adequately support competitive strategy, conducted field studies of three successful transport companies. Data were collected by semi-structured interviews of personnel, beginning at the highest corporate level downwards, using open-ended questions. The study indicated that MCS and accounting systems effective in a highly competitive environment do exist. Contributing factors were a high degree of centralization of control, the use of detailed cost accounting information to support the marketing function, while behavioral and social controls were used for revenue generating activities.

Given that willingness to accept change in a changing business environment is one determinant of competitive success, Veerbeeten (2010) carried out a survey of

Netherlands firms at the business unit level. The administrative capacity of the business unit was found to be the main driver of change in the MCS and accounting systems. The accounting system is relatively more resistant to change than the MCS as such.

Tucker, Thorne and Gurd (2009) point out that, in spite of the wealth of research results on MCS in relation to organizational strategy, there is still no consistent conceptual framework for the relation between MSC and strategy. They identify the reason as that there are actually four distinct "MCS-strategy relationships." They distinguish between the *design* and *use* of MCS, and between strategy *process* and *control*. These in turn define four types of MCS-strategy study. This classificatory framework can be usefully applied in the interpretation and comparison of past studies and in the design of new studies, as in the present instance.

As regards Dimension 1, Informal Control should be based on volunteer activities. Every member of the organization should participate in at least one volunteer activity such as a "volunteer group for social responsibility," "quality control circle team" or other. It is believed that behavioral control, motivation, and organizational culture can be developed through these volunteer activities. The effectiveness of the volunteer activities in support of the management control system can be assessed and evaluated via a quarterly Self-assessment Report or annually via

third party evaluation. To strengthen volunteer activities in support of informal control, the management should motivate it via various award channels such as naming an employee of the month, and employee of the year, instituting a Hall of Fame and otherwise.

As regards Dimension 2, in terms of Financial Performance, the balance sheet and profit and loss statement should be applied in all divisions of the organization. For example, costs for electricity, telephone, and so on should be measured and compared among divisions of the organization. In terms of Non-financial Performance, all relevant employees should be developed to have a sense of "ownership" of the activity on which they have performed. It is believed that if the employees feel they are the owners of the activities or projects on which they work, they will love and become happy with their work.

As regards Dimension 3, the State Enterprise Performance Framework for Excellence which comprises 7 components, that is, (1) Leadership for State Enterprise Organizations, (2) Planning for State Enterprise Organizations, (3) Customer and Stakeholder Orientation, (4) Measurement, Analysis and Knowledge Management, (5) Human Resource Orientation, (6) Process Management, and (7) Results of Business, should be used to specify KPIs for assessment. The criteria and targets for achievement of each KPI should be adopted and adapted from the criteria and targets

used by the Malcolm Baldrige National Quality Award. However, in applying the above 7 components for formulating KPIs, criteria, and targets, the organizational background and environment should be given close attention. In addition, the above 7 components should be applied in all main stages of the management cycle, that is in the planning, implementation, evaluation and standardization stages.

Scope of Study

For the purpose of this study, the focus is upon state-owned enterprises in Thailand. Specifically, it investigates the management control systems of such organizations in order to determine how well the MCS supports and contributes to successful organizational performance. Attention will be given to evaluating both the *design* and implementation of the MCS and the content of organizational strategy and *process* of formulating and implementing strategy and the relationships among these four variables (Tucker, Thorne and Gurd, 2009).

The criticism has been raised that these organizations are often inefficient as compared with private organizations. Where such inefficiency is found, the study will endeavor to ascertain the causes of such inefficiency and suggest remedies. Since inefficiency may arise from employee attitudes towards and evaluation of the tasks they perform, these factors need to be investigated (Da Fonseca, 2010).

The study aims to establish critical success factors for optimum performance of state-owned enterprises in the currently rapidly changing business and economic environment.

Data Collection and Data Analysis

Secondary data will be collected from existing publications and research reports on state-owned enterprises in Thailand: their background, organizational structure and existing management control systems. In view of the fact that organizations are increasingly urged to adopt techniques of Total Quality Management (TQM), Results-based Management (RBM) and the Balanced Scorecard (BSC), attention will be paid to how these techniques are being implemented in the organizations under study, and how they contribute to organizational performance. In this connection, the study by Metri (2005) is a useful guide to TQM frameworks and their use in the formulation of critical success factors. Though the emphasis is on state-owned enterprises in Thailand, data on other types of organization will not be ignored where these appear relevant.

Primary data will be obtained from Thai state-owned enterprises by (i) in-depth interview of experts in the field of MCS in order to obtain recommendations for improving the conceptual framework and scheme for statistical analysis, (2) a structured questionnaire schedule for interviewing relevant management personnel at

top, middle and lower management levels. Wherever possible an effort will be made to verify data by triangulation among independent data sources.

An in-depth case study of a selected organization, the Bank for Agriculture and Agricultural Cooperatives (BAAC) is proposed. This organization, acting through its many branches throughout Thailand, is the largest source in the country of capital and financial services to Thai farmers and to rural development in general, supporting government policy for agricultural development. Moreover, it is noteworthy for its good financial performance, having received awards as an Outstanding State Enterprise from 2005 onwards. Such a performance implies an effective MCS and a good corporate governance system. Hence BAAC provides an appropriate case for study into how this effectiveness has been achieved.

Expected Research Findings

It is expected that the results of this research will:

1. Provide an overall picture of how state-owned enterprises function in Thailand and the relationship between the management control system and the effectiveness of organizational strategy implementation within state-owned enterprises.

2. Throw light on how Total Quality Management, Results-based Management, and the Balanced Scorecard are implemented within state-owned enterprises and how they contribute towards effective organizational strategy implementation.

3. Reveal the critical success factors, within the management control system, for effective organizational strategy implementation, and suggest recommendations as to how the efficiency and effectiveness of state-owned enterprises can be improved. The research findings may also contribute to the development of a comprehensive conceptual framework for the relationship between management control systems and organizational strategy formulation and implementation.

Conclusions and Recommendations

This proposed conceptual framework for the study of management control systems in state-owned enterprises will be limited to state-owned enterprises in Thailand. It is intended not just to revise the existing conceptual framework but as well to create an innovative conceptual framework on management control systems. Based on the experience of state-owned enterprises in Thailand, the achievement of the given objectives of the study will be strengthened by integrating the management control systems being used by all state-owned enterprises that are State Enterprise Performance Appraisal (SEPA) techniques under the supervision of the State Enterprise Policy Office (SEPO). The SEPA techniques are developed from the Malcolm Baldrige National Quality Award (MBNQA).

Apart from the SEPA techniques, other relevant techniques are used to strengthen the management control systems among state owned enterprises in

Thailand, that is Results-based Management (RBM), the Balanced Scorecard (BSC) and Total Quality Management (TQM). It is hoped that all these techniques will help discover critical success factors (SCFs) which will lead to Organizational Strategy Effectiveness (OSE). This research will overview the relevant research findings for formulating a more appropriate model for highly effective organizational strategy implementation within the MCS. An interdisciplinary approach will be used to formulate the conceptual framework.

Last but not least, this research aims to produce an innovative model for a management control system (MCS). As a result, this proposed conceptual framework intends to propose a new model for MCS instead of merely evaluating the existing models. It is recommended that this proposed conceptual framework should be adapted and improved in order to be more appropriate and suitable to the environment of the organizations under study.

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MOBILE PHONE APPLICATIONS AS INNOVATIVE MARKETING TOOLS FOR HOTELS

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Abstract

Continuous growth in mobile Internet users has created an opportunity for hotel marketing. Mobile marketing (m-marketing) is a means for hotels to communicate and interact with the travel market. Mobile phone applications (apps) are specific m-marketing tools designed for the interchange of information, networking, and leisure. The study evaluated mobile phone apps as marketing tools for hotels, including the extent of marketing outcomes. Data came from observations of and reports on the mobile phone apps of InterContinental, Hilton Hotels and Marriott Hotels. The results indicated that mobile phone apps could be effective marketing tools based on app downloads, actual bookings and sales. Development cost is fixed while potential revenue could be exponential. Hotels using mobile apps can improve marketing outcomes by using tracking and reporting tools, making better versions, expanding features, and ensuring differentiation.

Keywords: hotel marketing, mobile marketing (m-marketing), mobile technology adoption, mobile applications (apps), travel decision making

Introduction

Growth in the number of leisure and business travelers who use Internet-capable phones for travel planning is set to grow from 4 percent in 2011 to 15 percent toward the end of 2012 (Martin, 2011). In a survey of British travelers, 45 percent of the respondents have mobile phones, which 17 percent used for holiday searching using mobile applications (apps) or websites, and 3 percent used for booking (Tealeaf Technology, Inc., 2011). In the United States, 60 percent of mobile phone owners use their device to go online and 11 percent of them eventually make purchases of different goods including travel packages on their respective devices (Smith, 2010). Developing mobile phone apps for these purposes therefore represents a significant marketing opportunity for hotels.

Existing mobile apps support a wide range of functions that include providing information on hotels, restaurants and bars, as well as transportation arrangements and tourist attractions; enabling location or map directions; and supporting picture and video sharing through email and social media websites (Tealeaf Technology, Inc., 2011). Mobile apps are also useful in making last-minute arrangements on accommodation and transportation (Martin, 2011).

Hotels have created and utilized mobile phone apps as marketing tools. Many apps that are compatible with iPhone, Blackberry, Android, and smart phones fall under the travel category. InterContinental Hotels Group (IHG), Hilton Hotels and Marriot International are three global hotel chains that have invested in mobile apps. Reports on these hotels show that they gained a significant number of application downloads and users that can be associated with actual bookings. IHG generated at least $130 million from bookings using its mobile website and mobile application in 2011 (Jacobs, 2011). Hilton Hotels recorded 100,000 mobile app phone bookings in 2011, which significantly increased revenue by 200 percent (Heller, 2011). Likewise, Marriott International gained at least $1.25 million from mobile app bookings (Johnson, 2011).

This study seeks to provide an evaluation of mobile phone apps as marketing tools and when employed, the extent of marketing outcomes. The results inform on whether hotels should adopt mobile apps as m-marketing tools and if they do, the ways through which they can ensure success.

Literature Review

Shankar and Balasubramanian (2009) define mobile marketing (m-marketing) as "the two- or multi-way communication and promotion of an offer between a firm and its customers using a mobile medium, device, or technology" (p. 118). The

distinction of m-marketing as a tool lies in the technological medium and process it uses in communicating with consumers. Mobile phones are handheld devices used in accessing, sending and sharing data via call, text and other mechanisms depending on phone features. Mobile phones with Internet capability support similar features and functions as Internet-connected personal computers, laptops and similar computing devices. As such, m-marketing takes advantage of both the mobility and wide reach afforded by mobile technology (Ngai & Gunasekaran, 2007). People usually carry their mobile phones wherever they go. Moreover, there are more than 1 billion mobile Internet users worldwide, which should increase to 2.89 billion by 2015 to represent a penetration rate of 37 percent (ResearchandMarkets, 2011).

A key driver of the success of m-marketing is the acceptance and use by consumers since the power of mobile marketing depends on the extent of consumer responsiveness (Heinonen & Strandvik, 20007; Pousttchi & Wiedemann, 2007). Consumer response creates and establishes the value and outcomes of a mobile-supported marketing offer (Carroll, 2007). A study (Picoto, Palma-dos-Reis & Belanger, 2010) on the organizational effect of mobile offers shows that customer response reflects on the sales support, customer service, innovation, productivity and flexibility of the firm. One way of evaluating marketing offers via mobile phones is by looking into the extent and characteristics of customer responses.

A number of factors can measure customer responsiveness. Pousttchi and Wiedemann (2007) identified these factors as perceived utility, reward, perceived ease of use, free viral content, initial contacts, first-mover advantage, critical mass and scalability. Additionally, Kourouthanassis, Georgiadis, Zamani and Giaglis (2010) identified expected performance as a significant determinant in the acceptance of m-marketing offers.

A model for m-marketing in hotels has been proposed by Wang and Wang (2010) in a study on customer adoption of mobile hotel reservation. The model identifies two sets of factors affecting customer adoption, namely perceived benefits and perceived sacrifice. Based on the study, the perceived benefits of information quality and system quality were found to have a significant influence on perceived value and the behavioral intention to use mobile hotel reservation. Moreover, the perceived sacrifices involving technological effort and perceived cost have a significant negative influence on perceived value and intention to book in their hotel of choice using their mobile phones. A newer study (Sangle &Awasthi, 2011) also identified similar components of travel consumer concerns when valuing and using mobile services, which include the technical aspects of functionality and ease of use together with the non-technical factors of cost, risk, compatibility and personal innovativeness. Hu (2011) also found support for the significant relationship between

perceived value and purchase intention, with customer satisfaction as the mediating factor.

Mobile apps are a way for hotels to make marketing offers. Existing mobile apps facilitate transactions, content dissemination, social networking, personal productivity and leisure (Gasimov, Tan, Phang & Sutanto, 2010). Mobile apps support the marketing offers of hotels through information sharing, choice selections, games, maps, and other apps that support travel planning. In studying use behavior for mobile apps, Ho and Syu (2010) found that the main motives and sought-after rewards in using mobile apps are entertainment, functionality, information, socialization, intellectual stimulation, following a trend, and learning. The factors that determine consumer use of mobile apps can also serve as areas of focus in evaluating the marketing effectiveness of hotel mobile apps.

Methodology

The study used qualitative research, a method that seeks to organize data into categories and identify emerging patterns (Creswell, 2009). Data collection involved observation of customer reviews and hotel reports posted in the mobile app pages of IHG, Hilton Hotels and Marriot International as well as customer reviews and in-store ratings found in the mobile app stores (Apple, Blackberry, Google Play for Android Apps, Windows Phone) that offer the apps of the three hotels. Direct links to these

stores are found in the mobile app pages of the three hotels. Data collected from these sources comprised of individual and overall average ratings of the mobile app of each hotel, specific customer comments, download statistics, and some data on mobile app hotel reservation and sales. Observation covered the period of January to March 2012.

Use of content analysis on customer comments resulted to several recurring categories, particularly the common focus on cost, ease of use, functionality, information value, socialization support, and trendiness. These categories coincided with the determinants of use or adoption as identified in the review of literature. After which, a comparison of trends for the three hotels was made by determining the ratio of positive and negative comments and identifying the positive and negative comments that were raised by majority of the reviewers. The comparison provided an evaluation of mobile apps for hotels, particularly the extent of adoption and use of customers and the marketing outcomes. The comparison also identified the aspects of the mobile apps of the three hotels that can be improved to better support m-marketing success.

Findings

IHG, Hilton and Marriott are three large international hotels that are using mobile phone apps as marketing tools. A comparative evaluation of their use of mobile apps as marketing tools provides a glimpse of the usefulness of these tools in

marketing, the problems that may emerge, and the expected outcomes. The experiences of these three hotels serve as guide for other hotels in deciding on whether to develop mobile phone apps of their own.

Mobile Apps as Marketing Tools

Table 1. summarizes the characteristics of the mobile phone apps as marketing tools. The mobile phone apps incorporate the hotel name as their umbrella brand. InterContinental created IHG Mobile as the general name for its mobile phone apps. Hilton launched its Hilton Free iPhone App. Marriott similarly introduced its Free

Table 1. Mobile Application Characteristics

App Characteristics	IHG	Hilton	Marriott
Name of App	IHG Mobile (Priority Club Rewards)	Hilton Free iPhone App	Free Marriott Mobile App
Date Launched	April 2010 (iPhone), July 2010 (Android)	November 2009	August 2011
Phones Supported	iPhone, Blackberry, Android, Windows phone	iPhone	iPhone, Blackberry, Android
Language Supported	English, Chinese, French, German, Japanese, Spanish	English	English, Chinese, French, German, Spanish
Marketing Offer	Priority Club Rewards (Booking with best price guarantee and no booking fees, Information search, one-click call to hotel front desk, check and redeem rewards)	HHonors Reward (Booking via eCheck-in, Information search, customized room requests by calling hotel customer care, access hotel specials and rewards)	Marriott Rewards (Booking, Information search, explore rewards)

Marriott Mobile App. This works well in transferring brand value to the apps to ensure downloads from customer recognition of the brand.

Mobile phone app for hotels is a relatively new marketing development. Hilton was the first to introduce its mobile app for iPhone in November 2009. IHG followed suit a few months later in April 2010 for iPhone and July 2010 for Android phones. Marriott later introduced its mobile app in August 2011. As first-mover, Hilton's mobile app gained instant popularity. As followers, IHG and Marriott attracted customers to their mobile apps by making better versions.

A difference exists in the mobile phones compatible with the app of each hotel. Compatibility with types of mobile phones reflects the intended market. Hilton only aimed for the segment of the travelers market using iPhones. IHG went after a broader market by making their mobile app compatible not only with iPhone but also with Android phones, Blackberry and Windows phone. Marriott first developed its app for Blackberry and then developed versions for iPhone and Android phones.

Similarly, there is a difference in the geographic market segment targeted by the respective hotels. Hilton only offered its application in English. A likely explanation is that the United States is the biggest iPhone market. IHG and Marriott expanded their target markets by offering their apps in several other languages including Chinese, French, German and Spanish. IHG even included Japanese.

The marketing offers made by the three hotels via the mobile app similarly relate to booking and their rewards system. Priority Club Rewards is the specific mobile app of IHG that connects booking and rewards. Through this app, customers can make hotel arrangements, find information related to the hotel and their travel destination, register and access their rewards account, and connect to the hotel's customer care. Hilton has a similar marketing offer with the rewards program branded as HHonors Reward. Marriott also offers similar service features through its Marriott Rewards. As such, using the mobile apps to make reservations also makes the user eligible for rewards.

Evaluation of Mobile Phone Apps as Marketing Tools

Customer adoption and use of a mobile app is a determinant of its success as a marketing tool (Carroll, 2007; Picoto et al., 2010). As a successful tool, its adoption and use should translate into bookings and revenue (Hu, 2011; Sangle &Awasthi, 2011). In determining success, an evaluation can be done by considering data from customer feedback. Perceived benefits in using the mobile app should be greater than perceived sacrifices in order to support positive marketing outcomes (Wang & Wang, 2010).

Customer Feedback

Table 2 summarizes customer reviews and responses to the hotels' mobile

phone apps. First-mover advantage in mobile apps can generate the necessary marketing edge in establishing a market, gaining loyal users, and increasing earnings (Pousttchi & Wiedemann, 2007). However, a consideration of customer responses to the mobile apps of IHG, Hilton and Marriott indicates that this may not be the case. The responses came from reviews and comments in the mobile app pages on the Apple, Blackberry, Android and Windows app stores. Hilton's launch of its free iPhone app in 2009 generated buzz among iPhone users. However, problems with the updates led to an increase in negative reviews in the succeeding months. Hilton mobile app received an average of 3 out of 5 stars based on all customer reviews, but this decreased to 2 out of 5 stars based on reviews of the current version. Meanwhile, IHG launched its mobile app for a broader market. Significant downloads were also made from the Blackberry and Windows mobile app stores. IHG's mobile app received a rating of 3 stars for all versions, with 4 stars for the current iPhone version and 4 stars in the Android store. Increases in positive feedback were due to improvements in the current versions of the app. Marriott, a late comer in mobile app development, also generated significant interest from customers. It was able to sustain interest by gaining 3 stars for all versions, with 3.5 stars for the current iPhone version and 4 stars in the Android app store. By introducing better versions and working on significant improvements in the upgrades, IHG and Marriott were able to capture a

market pool and continuously engaged the customers who have downloaded their mobile app. An expressed positive experience with the mobile app mirrors sustained interest and indicates that from the customer's point of view, the expected performance was met (Kourouthanassis et al., 2010).

Recurring positive and negative feedback from consumers identify which mobile app features caught and sustained the interest of consumers as well as the factors that adversely affected their mobile app experience. There are similarities and

Table 2. Customer Feedback to Mobile App

Form of Response	IHG	Hilton	Marriott
Ranking	4 stars based on current version and 3 stars based on all 642 Apple Store customer reviews, Rated 4 of 5 stars based on 737 customer reviews of Android version in Google Play, Average rating of 1.5 of 5 stars based on 27 customer ratings in Blackberry App World	3 of 5 stars based on all customer reviews and 2 of 5 stars based on customer rating of the new version in Apple Store	3 of 5 for current version based on 12 reviews and 3.5 of 5 for all ratings in Apple Store, 4 of 5 stars based on 518 customer reviews of the Android version in Google Play, 3 of 5 stars based on 92 reviews in Blackberry App World
Common Positive Feedback	Very useful especially during travel, simple and easy to use, helpful for last minute arrangements and viewing booking and location options, better updated versions, useful navigation to hotel guide	Great for frequent use, shows booking and rewards information	Very useful when using reward points, easy to use, quick access, good for searching booking information
Common Negative Feedback	Screen size does not fit phone, fit slow and high power consumption, large program size and storage space required	Upgrade made the application unusable, broken links, log-in problems, not linked to calendar	Difficult to navigate, loading problem, no automatic log-in, not linked to calendar, poor map navigation

differences in the feedback on the apps of the three hotels.

Positive feedback on the mobile apps of the three hotels included comments on the usefulness of the app in seeking travel information and making hotel arrangements. Many of the app users of IHG mentioned the usefulness of the app in making last-minute arrangements, which is crucial when they are already on the road and nearing their destination. Many customers also commented more on the improvements of the upgrades rather than the problems they faced in using the current versions. Hilton app users commonly expressed their appreciation for the frequent utility of the hotel's app and the ease in accessing their rewards. While some customers gave positive comments on the better functionality of the upgrades, a significant number also expressed their disappointment in the glitches experienced in shifting to such upgrades. Most of the reviews of the Marriott app focused on the ease in using the app and accessing booking and rewards information.

Negative feedback on the apps of the three hotels focused on the features and technical aspects of the upgrades. The common negative comments for the IHG app include a large memory requirement, screen resolution adjustments and high power consumption. Problems in downloading and using the upgrades as well as log in problems and broken links were common negative reviews on the Hilton app. Many also commented on the lack of link of the app to the calendar function of the mobile

phone to enable setting up reminders and making schedules. Apart from problems with the upgrades, common comments on the Marriott app include difficulty navigating the app, poor map features, and lack of automatic log in.

Adoption of Mobile Phone Apps by Customers

Based on the ratings and the positive and negative comments posted on iPhone, Android, Blackberry and Windows phone app stores, an evaluation of customer adoption and use is shown in Table 3.

Consumers incur a minimal cost in using the mobile app of the three hotels. While the app download is free, incidental costs only include Internet access and other customizable product and service purchases. The risk to consumers is minimal to moderate since hacking may happen and the app may become unstable especially while on the road. Technological effort is minimal to moderate for IHG and moderate to maximum for Hilton and Marriott based on the need for customers to ensure the compatibility of their mobile phones with the required specifications of the mobile app. For instance, limited phone memory can cause crashes.

Customers may also need to adjust their phone resolution to have the best view in navigating the app. Troubleshooting problems, especially with upgrades, also require effort from app users.

The benefits of using mobile phone apps are many. At the minimum, a mobile app

Table 3. Customer Adoption and Use of Mobile App

Measures of Customer Adoption/Use	**IHG**	**Hilton**	**Marriott**
Perceived Sacrifices			
Cost to Consumers	Minimal (App is free, cost related to app use include Internet connectivity and purchases)		
Risk to Consumers	Minimal to Moderate (hacking, phone compatibility, app instability)		
Technological Effort Required	Minimal to Moderate (large file size and phone memory required, adjustment of screen resolution to fit phone, troubleshooting especially upgrades)	Moderate to Maximum (Log-in problems, broken links, application and upgrade crashes)	Moderate to Maximum (Log-in problems, Difficulty in navigating app, unstable upgrades)
Perceived Benefits			
App features	Basic (booking, information research, rewards access, link to customer care support)		
Ease of Use	Simple (multiple choices and one-click selection)	Slightly Difficult (Log-in problems and crashes)	Slightly Difficult (Log-in problems and navigability)
Functionality	Useful on the road and for immediate bookings		
Information Value	General not customizable (need to call customer care for customization)		
Socialization Value	Moderate (Facebook 4,355 likes/176 talking about this, 2-3 days old wall posts; Twitter 1,525 tweets, 6,013 following, 5,998 followers, 24 hour tweet updates)	Moderate (Facebook 19,466 likes, 874 talking about this, 24 hour updates)	Moderate (Facebook 96 likes, 4 talking about this, 24 hour update, Twitter 3,545 tweets, 5,164 following, 30,870 followers, 24 hour tweet updates)
Keeping with the Trend	Moderate to High (Growing volume of downloads and customer feedback, Continues updates of app)		

provides access to basic information on hotels and destinations. Consumers would find this benefit useful, if the mobile app is efficient to use. Accessing the IHG app is

easy with simple choices. In comparison, there could be a slight difficulty in using the Hilton and Marriott app because of log in, navigation and feature limitations. The apps are highly functional especially when the user is already en route and requiring immediate hotel arrangements. Around 50 to 65 percent of bookings made through mobile phone apps are accommodations for the same day. Information accessible through the mobile app is general and not customizable but a one-click access tocustomer care is available. Socialization value is moderate with the hotel apps linked to Facebook and Tweeter and having hundreds of likes, fans, conversation threads, and tweets updated within 2 to 3 days or even 24 hours. However, Hilton's app is visible only on Facebook and Marriot's app is more visible on Tweeter than on Facebook. Customers still consider mobile apps of hotels to be trendy as shown by the increasing number of app downloads and the continuous updates made by the hotels on their apps.

Overall, the perceived sacrifices and perceived benefits indicate that while customers incur minimal costs, some risks and some effort in using the app, the perceived benefits are still worth the adoption and use of the mobile app especially when doing last minute hotel bookings while already on the road.

Marketing Outcomes

Determining the outcomes in using the mobile app as marketing tools is

difficult because mobile apps constitute a relatively new development in hotel marketing. Hence, mobile app tracking tools and surveys are limited. In lieu of these, marketing outcomes can be gleaned from the number of app downloads, the number of hotel reservations made through the mobile app, and the revenue attributed to the mobile app as shown in Table 4 below .

Table 4. Mobile App Marketing Outcomes

Outcomes	IHG	Hilton	Marriott
Number of App Downloads Since Launch	250,000-500,000 (70,000-100,000 for iPhone and 250,000+ for Android, Blackberry and Windows phone)	250,000-500,000 (iPhone)	250,000-500,000 (iPhone, Android and Blackberry)
Number of Hotel Reservations Using App	1,000 percent increase in hotel room night booking since launch, 50 percent of mobile bookings were made using the app	100,000 hotel nights in 2010	3 percent of mobile bookings or .7 percent of gross revenue
Revenue Attributed to Mobile App	$10 million a month (all mobile app versions), $3 million (iPhone)	200 percent monthly increase in mobile app revenue	$1.25 million of $21 million in monthly property revenue

Based on the download tracking features embedded in mobile app stores and reports, mobile app downloads for the apps of the three hotels fall within the 250,000-500,000 range. The highest number of downloads for IHG and Marriott is for the Android version followed by the iPhone version. There is also a significant number of downloads for the Blackberry and Windows phone versions. Assuming that those who downloaded used the app for booking even once, the number of downloads could then represent the number of hotel reservations attributed to the mobile app and the

revenue these generated can be gleaned.

No standard measure of hotel bookings made via the hotel apps was available. Reports by the hotels show a higher figure than the industry average of 30 percent of total bookings attributed to mobile apps (Jacobs, 2011). According to IHG (2011), its mobile bookings have increased by 1,000 percent and half of these were through its mobile app. Hilton reports that its mobile app bookings have reached 100,000 hotel nights (Heller, 2011). Marriott reported a smaller number of 3 percent of mobile bookings made through its app (Johnson, 2011). An explanation could be that it was less than one year since Marriot's mobile app launch, while the mobile apps of the other hotels have been operating for more than a year. In relation to cost, a report in ComputerWeekly recommends that the cost of a good app should not be less than £15,000-£25,000 or around $23,800-$39,600 while the development fee is $99 annually for Microsoft and Apple apps and $25 annually for the Android apps downloadable from Google (Williams, 2011). The cost of mobile app development is relatively fixed while revenue generation can be exponential depending on both the number of app downloads and the actual bookings using the app.

Similarly, no standard measure of revenue attributed to mobile app bookings was found. However, based on existing reports, revenue from mobile apps are substantial. IHG purportedly earns $10 million a month with $3 million coming from

iPhone mobile app bookings (HotelMarketing, 2011). No definite value was reported for Hilton but according to estimates, the hotel experienced a 200 percent monthly rise in mobile app revenue in 2009 and 2010, a value expected to remain steady in the succeeding years (De Lollis, 2010). Marriott is presently earning $21 million in monthly revenue from mobile bookings and $1.25 million comes from mobile app bookings (eyefortravel, 2011).

Conclusion

A consideration of customer ratings and feedback on the hotel apps indicates that mobile apps are effective as marketing tools. The apps garnered many positive comments on ease of use, functionality for on-the-day booking, and continued use. Customers rendered positive and negative reviews on the apps. Positive reviews commonly emphasized the usefulness of the app in looking for hotel and destination-related information, making hotel arrangements, and checking or redeeming rewards. Common negative reviews revolved around the technical aspects of the app such as the memory requirement and screen size adjustment for the IHG app; unstable upgrades, log in problems and the lack of connectivity with phone calendars for the Hilton app; and the lack of automatic log in and poor map navigation for the Marriott app. Most customers who reviewed the hotel apps recognized their utility in helping them with their travel arrangements. An increase in downloads of the current versions

or the upgrades also support the continued use of the apps.

Marketing outcomes are difficult to measure because of limited information, primarily due to the limited tools and nil use of tools that measure mobile app activity and customer use behavior. Nevertheless, available information indicates the positive attitude of the three hotels as well as third-party reports with regard to the marketing outcomes of hotel mobile apps. Significant increases in hotel bookings using the mobile app have been recognized as directly translating into a rise in booking revenue. Bookings using the hotel mobile apps also instantly contribute to revenue since around half of bookings are for same-day accommodations. Hotels can raise their revenue from bookings by developing good apps with the potential to generate increasing revenue for an extended period at a fixed cost.

Recommendations

IHG, Hilton and Marriott can ensure continued downloads and use of their mobile apps by improving their apps based on customer feedback. Two points have emerged from the study.

First, customers are interested to see expansion of the content and features of the apps that would distinguish the app from the mobile website as well as improvements that would lead to the stability of the upgrades. Ultimately, the long-term goal in developing mobile apps is not just to gain downloads but also to sustain

continued use. Reliable and functional mobile app features and upgrades that make the app work better are focus areas in mobile app development.

Second, customers are more attracted to mobile apps with distinguishing features when compared to similar apps. Currently, the mobile apps of the hotels have similar basic features. Easy navigability emerged as a distinguishing factor for IHG's mobile app. Linkage between the calendar and other organizing features of phones and the mobile app of the hotels were suggested by some of the Hilton and Marriott mobile app users. Working on ways to differentiate a mobile app can help hotels to gain more app users and actual bookings through the app.

As in any marketing tool, evaluation of outcomes is an important process. This appears to be a weakness in the mobile app marketing of the three hotels. No standard derivation and presentation of mobile app marketing outcomes emerged. To support the assessment of outcomes, the hotels can use tracking and reporting software and devices, which provide accurate download and revenue statistics as well as user behavior. Such data, once available, will help hotels to have a more concrete evaluation of mobile apps as marketing tools.

The World Wide Web and mobile phone access have evened out the playing field for small to medium and large hotels, in terms of market reach and marketing cost. So far, only the large international hotels have invested in mobile apps. Their

apps, however, cater mainly to customers in North America and Europe due to the limited number of supported languages. Small and medium-sized hotels anywhere in the world can take advantage of this by also developing mobile apps and using popular mobile app stores to reach their respective target markets locally or internationally.

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OPERATING PERFORMANCE ANALYSIS OF TAIWAN'S FINANCIAL HOLDING COMPANIES: USING SUPER SBM EFFICIENCY MODEL AND CO-PLOT ANALYSIS

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Abstract

In this study, Super SBM Efficiency Model was used to solve the problem that CCR and BCC are unable to distinguish the order when many DMU values are 1 simultaneously. The two-dimensional graphs of Co-plot were also combined to understand the dynamic changes of each

financial holding company (FHC). The 14 FHCs were regarded as the research objects, from 2008 to 2010. The results showed Waterland was the leader in the management efficiency matrix. However, Cathay and Fubon were the leaders according to the Co-plot analysis. The results can be provided for the management of FHCs as reference to operational directions and decision making.

Keywords: Super SBM efficiency Model, Co-plot Analysis, management matrix, financial holding company (FHC)

Introduction

The trend of cross-industry management emerged in the financial industry globally after the restrictions on cross-industry operation were removed by the Gramm-Leach-Bliley Act passed in U.S.A. in 1999. Hence, the Taiwan government launched a series of financial reforms to correspond to the changes in the international environment. First, the government announced the enforcement of the Financial Institution Merger Act in 2000, and referring to the Gramm-Leach-Bliley Act in U.S.A., it allowed the establishment of FHCs and approved the cross-industry management of the financial industry in 2001 in hopes of providing total business integration and satisfying customers' demand for one-stop shopping in order to achieve economies of scope and scale, develop comprehensive benefits, and advance the global competitiveness of the financial industry in Taiwan.

Until April, 2012, 16 FHCs have been established in Taiwan, respectively Hua Nan Financial Holdings, Fubon Financial Holdings, Cathay Financial Holdings, China

Development Financial Holdings, SinoPac Holdings, Chinatrust Financial Holding, First Financial Holding, E. Sun Financial Holding, Yuanta Financial Holdings, Mega Financial Holdings, Taishin Financial Holdings, Shin Kong Financial Holding, Jih Sun Financial Holdings, Waterland Financial Holdings, Taiwan Financial Holdings, and Taiwan Cooperative Financial Holdings. FHCs rapidly expand their organizations and enhance economic efficiency mainly through merging. However, successful merging is never easy. Post-merging integrated management is not only the starting point of organizational culture integration but also the beginning to create values of merging. This study was thus aimed to investigate if the operational efficiency of FHCs was really improved after being merged or if their operational efficiency was reduced due to the diversified businesses or the enormous organization. Meanwhile, the changes between the variables and the FHCs were observed.

The operational efficiency of the financial industry was explored in a lot of previous studies, and DEA was extensively applied in this industry. To overcome the problem that One-stage DEA lacks management information, Seiford and Zhu (1999) employed Two-stage DEA to analyze the profitability and marketability of the top 50 banks in U.S.A. Lo and Lu (2006) used Two-stage DEA to analyze the profitability and marketability of 14 FHCs in Taiwan. Sheu, Lo, and Lin (2006) used Two-stage DEA to analyze the relationships between the diversification of FHCs, profit

efficiency, and market efficiency. The CCR or BCC model of traditional DEA was employed in most of the aforementioned research to calculate the efficiency scores. Frequently, the efficiency scores of many decision-making units (DMUs) were 1 simultaneously, which resulted in that the performance rankings of all the DMUs were the 1st place, and the performances could not be further differentiated.

Although Two-stage DEA reflects management information in the production process, it cannot clearly display the relationships between inputs and outputs through two-dimensional graphs. Thus, the complementation between Two-stage DEA and Co-plot was applied in this study to study the performance of the FHCs in Taiwan. The research purposes are as follows. First, Two-stage DEA was employed to evaluate and compare the operation-ability and marketability efficiency of each FHC. Secondly, Super SBM Efficiency was used to solve the defect that the efficiency scores which were simultaneously 1 could not be differentiated in the aforementioned studies. Finally, Co-plot was combined to two-dimensionally display the relationships between DMUs and each variable to enables researchers to more clearly understand the changes of each FHC on a two-dimensional graph.

Literature Review

FHCs achieve the expansion of customer source and economies of scope by forging alliances with other industries, such as banks, securities firms, and insurance

companies, and they satisfy consumers' demand for one-stop shopping through co-marketing, cross-use of information, and product combination. Berger, Hunter, and Timme (1993) suggested that DEA, a good comprehensive index for efficiency measurement, should be used as the index for measuring the performance of financial institutions because the advantages include being able to deal with problems related to multi-inputs and multi-outputs, maintaining units invariance, and keeping the weights from being influenced by subjective factors. Chen, Chiu, and Huang (2010) applied four models, respectively Super-BCC, Super-SBM, Threshold, and Modified-Super, to the investigation on the performance of banks of FHCs and non-FHCs in Taiwan and compare the differences between the four models. Tsai, Wu, and Wang (2011) analyzed the operation and profit efficiency of the banks in China between 2004 and 2006. The research showed that larger and older banks are better than smaller and newer banks in terms of operation and profit efficiency.

Seiford and Zhu (1999) were the first researchers using Two-stage DEA to analyze the profitability and marketability of the top 55 banks in U.S.A. In the first stage, employees, assets, and shareholders' equity were regarded as the input items, and income and profit were regarded as the output items to measure the profitability. In the second stage, the output items in the first stage, namely income and profit, were

regarded as the input items, and market value, total investment return, and earnings per share (EPS) were regarded as the output items to measure the marketability.

Since all the FHCs in Taiwan have not been established for a long time, there is not much literature in which Two-stage DEA was employed to investigate the performance of the FHCs. Lo and Lu (2006) used Two-stage DEA to research into 14 FHCs in Taiwan in 2003. In the first stage, employees, assets, and shareholders' equity were employed as the input items, and income and profit were regarded as the output items to measure the profitability. In the second stage, the output items of the first stage were adopted as the input items, namely income and profit, and market value, stock price, and EPS were used as the output items to measure the marketability. It was found that larger FHCs were better than smaller FHCs, and the FHCs based on life insurance were better than the FHCs based on banking and securities. In addition, some scholars used Two-stage DEA to explore the relationships between diversification, profit efficiency, and market efficiency (Sheu, Lo and Lin, 2006). The CCR or BCC model of traditional DEA was adopted in most of the aforementioned studies to calculate operational efficiency scores.

Traditional DEA is limited in research. Therefore, some scholars started to adopt the SBM model and the Super SBM model to investigate the efficiency of FHCs and the two-stage operational efficiency and use the matrixes formed by market

and operation efficiency to analyze the competitive advantages and disadvantages of each FHC in different stages (Wu, Wang, Chang & Chang, 2008). Chao, Yu and Chen (2010) argued that FHCs contain the production activities of different units, and traditional DEA is not suitable, so they adopted Multi-activity Data Envelopment Analysis (MDEA) to evaluate the performance of each FHC. However, there were differences among the business units of each FHC, so there were not many FHC samples which totally met the request of Chao et al. Raveh (2000) employed Co-Plot to analyze the performance of Greek banks. The major contribution was to draw banks and research variables on a two-dimensional surface to clearly understand the changes of these banks, in which the FHCs with similar operational behavior formed a group. Nath, Mukherjee and Pal (2001) used DEA and Co-Plot simultaneously to analyze the performance of Indian banks. The result showed that the banks with better profitability in DEA also had better performance among related financial variables in Co-Plot.

Research Design

All 14 FHCs in Taiwan were regarded as the research objects in this study. The research time was from 2008 to 2010, and the samples were obtained from the Taiwan Economic Journal (TEJ) data bank. The TEJ data bank is commonly deemed valid and reliable to the public, and widely used in academia (Lo & Lu, 2006; Sheu et.

al, 2006; Chen et. al., 2010). The framework of Two-stage DEA, the definitions of the variables, the Super SBM Efficiency model, the Co-plot method, and the correlations between variables are explained as follows.

The Framework of Two-stage DEA

Based on literature review, Fixed assets, Operating expenses, and Employees were regarded as input items, and Fee Income and Interest revenue were employed as output items in this study to measure Operation-ability in the first stage. In the second stage, the output items of the first stage, namely Fee income and Interest revenue, were regarded as input items, and Stock price and Market value were employed as output items to measure Marketability (Seiford & Zhu, 1999; Lo & Lu, 2006; Sheu, Lo & Lin, 2006). The framework of Two-stage DEA is illustrated as follows.

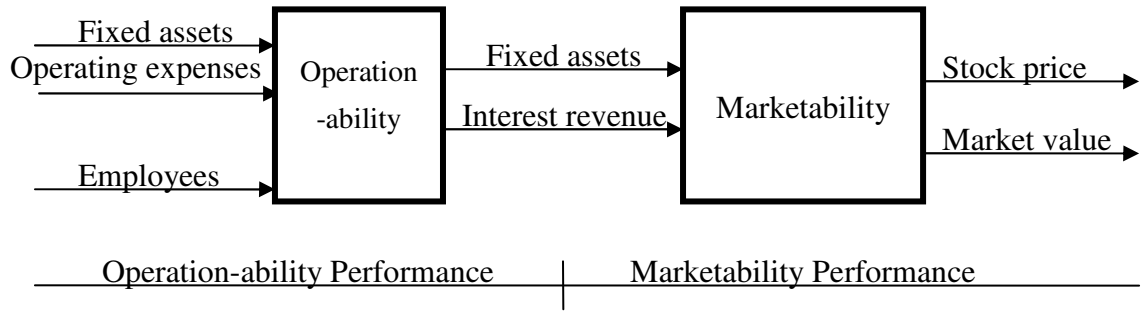

Figure 1. The Framework of Two-stage DEA

Variable Selection and Definitions

In the financial service industry, input and output items are usually determined by asset approach, intermediation approach, user-cost approach, and value-added

approach. In most of previous literature, intermediation approach and production approach were adopted to determine input and output items (Isik & Hassan, 2002; Bonin, Hasan & Wachtel, 2005). In this study, FHCs were regarded as intermediate institutions for providing financial services, that is, intermediaries for transforming financial resources instead of producers, by which input and output items were set.

The efficiency scores calculated by DEA were obtained through the computation of the input and output data of each DMU. Hence, certain relationships should be maintained between input and output items as well as the number of DMUs, so the analysis results of DEA will be effective. When an input or output item is added, the discriminating power of DEA will be reduced, but when a DMU is added, the discriminating power will be increased, so the number of DMUs should be the double of the sum of input and output items (Bowlin, 1987; Golany & Roll, 1989). In this study, 3 input items and 2 output items were selected in the first stage, 2 input items and 2 output items were selected in the second stage (Table 1), and the evaluated organizations were 14, so the aforementioned rules were conformed.

A correlation analysis was first conducted in order to prove that isotonicity exists between input and output items, that is, the increase of an input item should not cause an output item to decrease (Huang, 1993). The higher the correlation

Table 1. Definitions of input and output

Variables	Definition	Unit
Fixed assets	Assets, such as land, houses, and equipment.	NT$ million
Operating expenses	The expenses of marketing and management.	NT$ million
Employees	The total employees hired by a FHC annually.	Persons
Fee incomes	An important business activity income of a FHC, which is highly related to the profits.	NT$ million
Interest income	One of the most important incomes of a FHC.	NT$ million
Stock price	The annual closing price per share.	NT$
Market value	The stock price of a FHC multiplied by the total share capital.	NT$ million

Table 2. Pearson's correlation coefficient – the variables in the 1st stage

	FA	OE	EM	FI	II
FA	1				
OE	0.830	1			
EM	0.649	0.923	1		
FI	0.475	0.830	0.966	1	
II	0.836	0.757	0.609	0.476	1

Note: FA denotes fixed asset; OE denotes operating expenses；EM denotes employee; FI denotes fee income; II denote interest income.

Table 3. Pearson correlation coefficient - the variables in the 2nd stage

	FI	II	SP	MV
FI	1			
II	0.476	1		
SP	0.802	0.335	1	
MV	0.807	0.409	0.955	1

Note: FI denotes fee income; II denote interest income; SP denotes stock price; MV denotes market value

coefficients are, the more correlated the input and output items are. The data will also be positively correlated. The result of correlation coefficients is displayed in Tables 2 and 3, showing that all of the input and output items were positively correlated.

Super SBM Efficiency Model

This is a slack-based model for efficiency measurement, but the measured efficiency scores are still between 0 and 1 (Tone, 2001). Tone (2002) then brought up a revised slack-based model, namely the Super SBM Efficiency model, to improve the situation in which efficiency scores are simultaneously 1. There are two models of Super SBM Efficiency, one for Constant Return to Scale (CRS) and the other for Various Returns to Scale (VRS). The following is the Super SBM model for CRS.

$$\delta^{+} = Min\delta = \frac{\frac{1}{m}\sum_{i=1}^{m}\frac{\bar{x}_i}{x_{i0}}}{\frac{1}{s}\sum_{r=1}^{s}\frac{\bar{y}_r}{y_{r0}}}$$

$$\text{s.t. } \bar{x} \geq \sum_{j=1,\leq\neq 0}^{s} \lambda_j x_j$$

$$\bar{y} \geq \sum_{j=1,\leq\neq 0}^{n} \lambda_j y_j \qquad (1)$$

$$\bar{x} \geq x_0,\ \bar{y} \geq y_0$$

$$\bar{y} \geq 0,\ \lambda \geq 0$$

The Super SBM model in Formula (1) is converted into linear programming for the convenience of finding the solution:

$$\tau^{*} = Min\tau = \frac{1}{m}\sum_{i=1}^{m}\frac{\bar{x}}{x_{i0}}$$

$$\text{s.t. } 1=\frac{1}{s}\sum_{r=1}^{s}\frac{\overset{o}{y_r}}{y_{r0}} \qquad (2)$$

$$\overset{o}{x}\geq\sum_{j=1,\leq 0}^{n}\Lambda_j x_j$$

$$\overset{o}{y}\leq\sum_{j=1,\leq 0}^{n}\Lambda_j y_j$$

$$\bar{x}\geq tx_0,\ \bar{y}\geq ty_0$$

$$\Lambda\geq 0,\ \bar{y}\geq 0,\ t\geq 0$$

If the Super SBM model is modified into the model for VRS, the model will be as follows:

$$\delta^{+}=Min\delta=\frac{\frac{1}{m}\sum_{i=1}^{m}\frac{\bar{x}_i}{x_{i0}}}{\frac{1}{s}\sum_{r=1}^{s}\frac{\bar{y}_r}{y_{r0}}}$$

$$\text{s.t. } \bar{x}\geq\sum_{j=1,\leq\neq 0}^{s}\lambda_j x_j$$

$$\bar{y}\geq\sum_{j=1,\neq 0}^{n}\lambda_j y_j \qquad (3)$$

$$\sum_{j=1,\neq 0}^{n}\lambda_j y_j=1$$

$$\bar{x}\geq x_0,\ \bar{y}\geq y_0$$

$$\bar{y}\geq 0,\ \lambda\geq 0$$

DEA models can be divided into two types, namely input-oriented and output-oriented. Input-oriented models aim at the most effective input volume which should be used under the current output volume. On the other hand, Output-oriented models focus on the most effective output volume which should be used under the current input volume. In this study, it was considered that from the perspective of managers, the financial industry expects to obtain more outputs under current inputs, so the

Super SBM model based on the slacks of input-oriented VRS was employed in this study to evaluate the operational efficiency of each FHC.

Co-plot Analysis

The Co-plot method is correlation analysis, cluster analysis, and regression analysis in comprehensive multivariate analysis; in Co-plot, the clustering of research samples is displayed through simple two-dimensional graphs, and it is unnecessary to read complicated statistical reports (Raveh, 1993). In terms of Multidimensional Scaling (MDS), Co-Plot indicates applying a non-metric MDS method, namely Guttman's Smallest Space Analysis (SSA). It also can be applied to data measurement. When the P rays (variable axes) scattering from the origin of a graph point at the same place, the variables have a significantly positive correlation with one another. When the n observation points are located on a two-dimensional surface, similar observation points will be very close to one another and form a group, and the observation values are of similar characteristics and behavior.

The Four Stages of Co-Plot Analysis

(1) Standardization: To make the different units and measures between variables equal, the $Y_{n\times p}$ matrix is transformed into the $Z_{n\times p}$ matrix (Backhaus, Erichson, Plinke & Weiber, 2003). The standardization formula is:

$$Z_{ij} = (Y_{ij} - \overline{Y}_j) / S_j \circ \qquad (4)$$

(2) The measurement of different points: The measurement ($S_{ik} \geqq 0$) of different points is selected in each pair of observations ($Z_{n\times p}$); a symmetric n×n matrix (S_{ik}) is generated among different paired observations.

(3) The locations of points: The S_{ik} Matrix was drawn on a two-dimensional surface by means of MDS, and n observation values, ($P_i = 1, 2, \mathrm{K}\ , n$), are thus located in an Euclidean space, in which SSA was used to find a discrete coefficient, Θ, for measuring the good-of-fit of each observation. Here each row of $Z = \left(Z_{i1}, \mathrm{K}\ , Z_{ip}\right)$ is drawn on a two-dimensional surface (Guttman, 1968).

(4) Regression equations are employed to display the P variables in the two-dimensional Euclidean spaces of the aforementioned n located observations (Weber, Shenkar & Raveh, 1996).

The Judgment Index of Co-Plot

(1) Coefficient of Alienation: It is used to display the good-of-fit between original data and the data in the two-dimensional space. That is, two-dimensional graphs can be used to explain the images in the original P-dimensional space. The good-of-fit model can be regarded as a good one usually when the value is lower than 0.15 (Guttman, 1968; Weber et al., 1996). On the other hand, when the coefficient of alienation is too high, it indicates that those observation values are not suitable to be displayed on a compressed two-dimensional surface.

(2) Average of Correlations: It is used to examine if variables are closely related to the rays projected in a graph and to employ one average correlation value to explain if the P rays can be used to reflect the degree of the real data structure. A correlation value higher than 0.4 is usually ideal (Mindali, Raveh & Salomon, 2004). Lipshitz and Raveh (1998) argued that when a correlation value is lower than 0.6, the result will be insufficient to explain. The longer the rays are, the higher the overall correlation is; the higher the variable correlation is, the more identical the directions to which the arrows of the variables point (Paucar-Caceres & Thorpe, 2005).

Empirical Results and Analysis

The Super SBM model was used to evaluate Operation-ability and Marketability Efficiency of each FHC (Tables 4), and Co-Plot was then employed to observe the changes of each FHC.

The Empirical Result of Super SBM Efficiency Model

Table 4 shows each FHC's scores of operation-ability and marketability efficiency between 2008 and 2010. The higher an efficiency score, which was higher than 1, was, the better the operational performance of a FHC was. In terms of operation-ability efficiency, the top three FHCs were respectively Waterland, Mega, and Shin Kong between 2008 and 2010. In terms of marketability efficiency, the top three FHCs were respectively Waterland, Yuanta, and China Development in 2008

and 2009 whereas the top three were Waterland, China Development, and first in 2010. In general, the performance of Waterland was the best in whether operation-ability efficiency or marketability efficiency.

Two-stage DEA Management Matrix and Co-plot

To better understand the performance of the 14 FHCs in Two-stage DEA between 2008 and 2010, operation-ability performance was regarded as the horizontal axis, and marketability

Table 4. Operation-ability and Marketability efficiency scores

DMU	Efficiency Scores, 2008		Efficiency Scores, 2009		Efficiency Scores, 2010	
	Operation	Market	Operation	Market	Operation	Market
HN	0.7758 (11)	1.2292 (4)	0.7719 (12)	0.3649 (9)	0.7949 (11)	0.7429 (9)
FB	1.0899 (5)	0.9336 (6)	1.0503 (5)	0.6891 (5)	1.1846 (4)	0.8500 (7)
CA	1.0000 (7)	1.0000 (5)	1.0000 (9)	1.0000 (4)	1.0000 (10)	1.0000 (6)
CD	0.8275 (10)	1.8723 (3)	1.0388 (7)	1.5891 (3)	1.0352 (8)	2.4000 (2)
ES	0.8770 (8)	0.3719 (11)	1.0472 (6)	0.3538 (10)	1.0556 (7)	0.7568 (8)
YT	0.6350 (14)	2.9404 (2)	0.6321 (14)	4.0908 (2)	0.6658 (14)	1.5561 (5)
MG	1.4174 (2)	0.4592 (10)	1.3584 (3)	0.5859 (6)	1.2438 (3)	1.9063 (4)
TS	1.0000 (6)	0.0626 (14)	1.4212 (2)	0.1195 (13)	1.3304 (2)	0.2214 (13)
SK	1.1184 (3)	0.1163 (13)	1.0027 (8)	0.1180 (14)	1.0629 (6)	0.1056 (14)
WT	1.9581 (1)	4.8373 (1)	1.6321 (1)	19.6945 (1)	1.7402 (1)	3.1122 (1)
SP	1.1181 (4)	0.1941 (12)	1.0955 (4)	0.2941 (12)	1.1021 (5)	0.2570 (12)
CT	0.6664 (13)	0.4829 (9)	0.7016 (13)	0.3408 (11)	0.7209 (13)	0.6762 (10)
FI	0.8375 (9)	0.8173 (7)	0.8439 (10)	0.3880 (7)	1.0260 (9)	1.9416 (3)
JS	0.7139 (12)	0.6592 (8)	0.8102 (11)	0.3702 (8)	0.7597 (12)	0.5766 (11)

Notes：HN (Hua Nan); FB (Fubon); CA (Cathay); CD (China Development); ES (E. Sun); YT (Yuanta); MG (MEGA); TS (Taishin); SK (Shin Kong); WT (Waterland); SP (Sinopac); CT (Chinatrust); FI (First); JS (Jih Sun).

Table 5. The 2008-2010 Co-plot judgment indexes

index	2008	2009	2010
coefficient of alienation	0.08	0.06	0.07
average of correlations	0.90	0.96	0.95

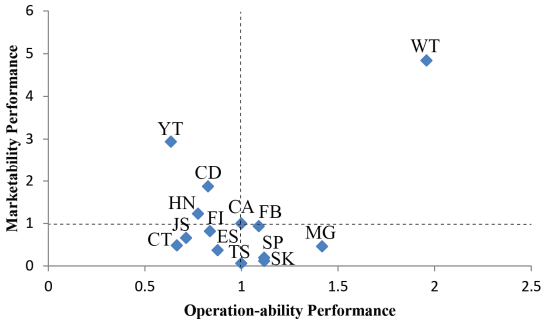

Figure 2A. The 2008 Two-stage DEA management matrix

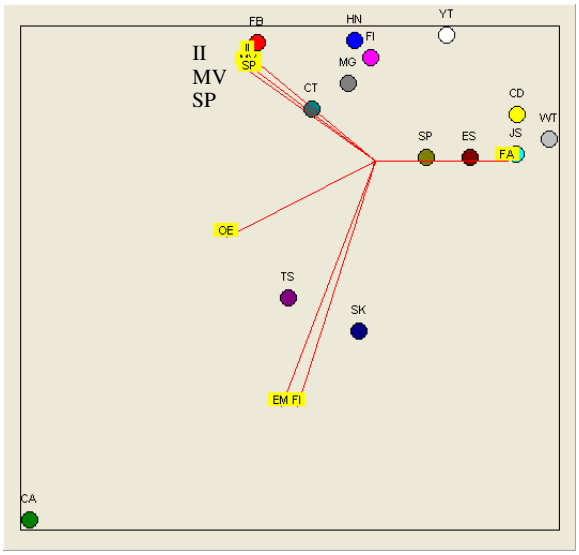

Figure 2B. The 2008 Co-plot figure

Note 1：HN (Hua Nan); FB (Fubon); CA (Cathay); CD (China Development); ES (E. Sun); YT (Yuanta); MG (MEGA); TS (Taishin); SK (Shin Kong); WT (Waterland); SP (Sinopac); CT (Chinatrust); FI (First); JS (Jih Sun).

Note 2: FA denotes fixed asset; OE denotes operating expenses；EM denotes employee; FI denotes fee income; II denote interest income; SP denotes stock price; MV denotes market value.

performance was regarded as the vertical axis to create a matrix of management efficiency. Furthermore, Co-plot was used to investigate group changes and observe the changes of the FHCs in different variables, including Fixed assets, Operating expenses, Employees, Interest revenue, Fee income, Stock price, and Market value, between 2008 and 2010. The Table 5 showed the coefficients of alienation were all lower than 0.15 (Guttman, 1968), and the averages of correlations were all higher than

0.6 (Lipshitz & Raveh, 1998) between 2008 and 2010, indicating the indexes were all within a reasonable range.

According to the management matrix in Figure 2A, Waterland and Cathay were the best FHCs in terms of operation-ability and marketability efficiency, especially Waterland, so they became the leaders in 2008. According to the Co-plot figure in Figure 2B, Cathay, Taishin, and

Shin Kong were outstanding in Fee income and Employees, especially Cathay; Fubon, Hua Nan, Yuanta, First, Mega, and Chinatrust were prominent in Stock price and Interest revenue.

It is known from Figure 3A that the performances of China Development, Waterland, and Cathay were the best, and Waterland was still the leader. According to Figure 3B, Cathay, Fubon, and Shin Kong were outstanding in Fee income, Market value, Employees, and Stock price, especially Cathay, while Taishin, Chinatrust, and Mega were prominent in Fixed assets and Interest revenue. This result was different from the result of Two-stage DEA management matrix.

It is clear in Figure 4A that Cathay, China Development, Waterland, Mega, and First were the FHCs with better performances, and Waterland was the leader in the market. According to Figure 4B, Cathay, Fubon, and Shin Kong were outstanding in Fee income, Market value, Employees, and Stock price, and Cathay was still the

leader in the market. Taishin and Chinatrust were notable in Fixed assets and Interest revenue.

Conclusion

Relative efficiency scores calculated by DEA were obtained through the computation of the input and output data of each DMU. Consequently, even small FHCs would come out on the top in terms of the efficiency ranking of DEA. For example, although Waterland was not the largest among the FHCs, its operation-ability and market-ability efficiency were more outstanding than other FHCs. Moreover, Co-plot can be used to observe the changes of a FHC since FHCs with similar operational behavior and characteristics will form a group. The result showed that Cathay was the industry leader whereas Fubon roused itself to catch up.

The features of Two-stage DEA and Co-plot were employed to profoundly analyze the operation-ability and market-ability efficiency of the FHCs in Taiwan. In addition, Super SBM Efficiency was adopted to solve the defect that the efficiency values which were simultaneously 1 could not be differentiated. The group of high efficiency and the group of low efficiency were clearly analyzed through the management efficiency matrixes of Two-stage DEA. In 2010, the group of high efficiency included Cathay, China Development, Mega, Waterland, and First while the group of low efficiency included Hua Nan, Jih Sun, and Chinatrust. Furthermore,

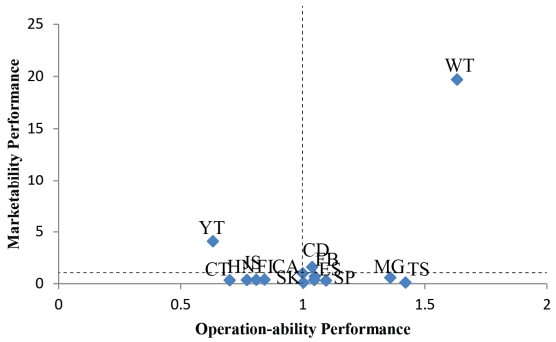

Figure 3A. The 2009 Two-stage DEA management matrix

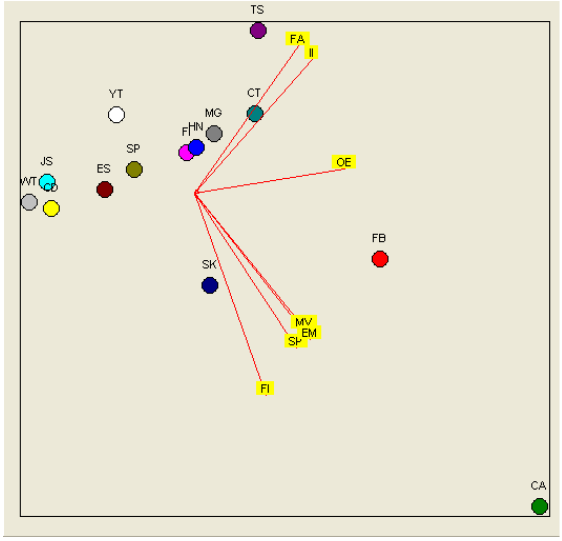

Figure 3B. The 2009 Co-plot figure

Note 1：HN (Hua Nan); FB (Fubon); CA (Cathay); CD (China Development); ES (E. Sun); YT (Yuanta); MG (MEGA); TS (Taishin); SK (Shin Kong); WT (Waterland); SP (Sinopac); CT (Chinatrust); FI (First); JS (Jih Sun).

Note 2: FA denotes fixed asset; OE denotes operating expenses；EM denotes employee; FI denotes fee income; II denote interest income; SP denotes stock price; MV denotes market value.

the two-dimensional graphs of Co-plot were used to examine the relationships between each FHC and the variables. Through these two methods, the changes of the FHCs in Taiwan as well as the operation-ability and marketability efficiency scores of each FHC were understood more clearly in order to provide FHCs with suggestions of appropriately adjusting the scale efficiency and remind FHCs of paying attention to external changes every minutes and bringing the competitive advantages into full play through optimal allocation of resources.

The biggest advantage of two-dimensional graphics analysis is able to produce the competitive situation of the visual graphics, very easy to analyze the inference. In

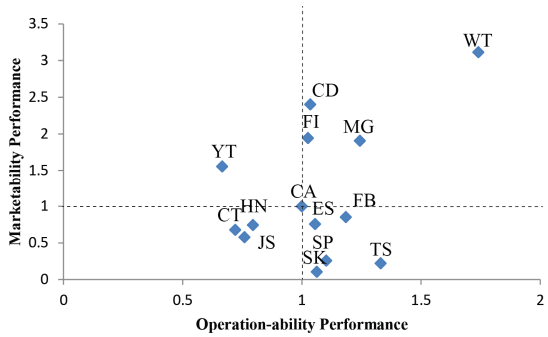

Figure 4A. The 2010 Two-stage DEA management matrix

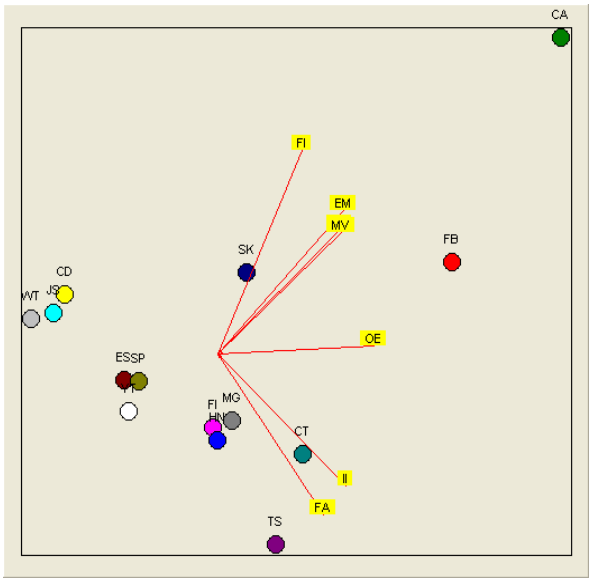

Figure 4B. The 2010 Co-plot figure

Figure 4. The 2010 Two-stage DEA management matrix and Co-plot figure.

Note 1：HN (Hua Nan); FB (Fubon); CA (Cathay); CD (China Development); ES (E. Sun); YT (Yuanta); MG (MEGA); TS (Taishin); SK (Shin Kong); WT (Waterland); SP (Sinopac); CT (Chinatrust); FI (First); JS (Jih Sun).

Note 2: FA denotes fixed asset; OE denotes operating expenses；EM denotes employee; FI denotes fee income; II denote interest income; SP denotes stock price; MV denotes market value.

practice, this study may also provide the management of FHCs to understand the company and other competitors, the competitive configuration, or even refer to the competitive strategy of the opponents. Moreover, this study offers the government furtherto understand the similarity and difference among FHCs and to explore the key strategic elements to serve as a reference for Taiwan's FHCs to formulate the future business and competitive strategies.

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ANTECEDENTS AND CONSEQUENCES OF JOB SATISFACTION: A CASE OF AUTOMOBILE COMPONENT MANUFACTURER IN TAIWAN

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Abstract

The present study tests a framework of two important antecedents and one important consequence of job satisfaction among employees from an automobile component manufacturer in Taiwan. Individual career management and organizational career management are two essential determinants of job satisfaction while organizational commitment is viewed as one key outcome of job satisfaction. A sample of 135 valid respondents was collected, 81.5% of which is male, 52.6% of which is single, 62.2% of which is at the age between 25 and 34, 58.8% of which had 1 to 5 working years, and 55.6% of which has an annual income ranging from 360,000 to 600,000. Three research hypotheses are tested with a series of simple regression analyses. The results had found that two antecedents are supposed to have significantly positive effects on job satisfaction. The positive effects of job satisfaction on organizational commitment are confirmed as well.

Keywords: Individual Career Management, Organizational Career Management, Job Satisfaction, Organizational Commitment

Introduction

Job satisfaction has been a widely studied concept in the literature. Organizations desire to have higher job satisfaction of their employees (Oshagbemi, 2003). Many researchers have found the relation of job satisfaction with job performance, organizational productivity and turnover intention (Judge and Bono, 2001; Aydogdu and Asikgil, 2011). In order to enhance job satisfaction of employees, methods such as job rotation, job enlargement, etc. are used in organizations. Job satisfaction is a very important attribute in organizations.

From the perspectives of organizations, job satisfaction of employees is linked to organizational performance and is viewed as a key factor that influences the turnover intention of employees. From the perspectives of employees, job satisfaction is related to life satisfaction and is deemed as a valuable contributor to individual career development.

The studies of job satisfaction include two major domains. First, job satisfaction is considered as a determinant of organizational outcomes such as business performance, employee turnover, and organizational commitment. Second, job satisfaction is considered to be influenced by stress variables such as role ambiguity and role conflict (Igbaria and Guimaraes, 1993). Career management, one of the most important issues in human resources, is essential to organizations. Unlike

the previous studies, we propose two key antecedents of job satisfaction namely individual career management and organizational career management.

Human resource is one of the most important assets. How to retain talent employees and to enhance their job satisfaction becomes one essential issue for organizations. Accordingly, the purpose of this study is to investigate the effects of individual career management and organizational career management on job satisfaction. The relationship between job satisfaction and organizational commitment is examined as well. The paper is divided into five sections including introduction, literature review, methodology, analysis and results, and discussion and conclusion in the final part.

Literature

Job Satisfaction

Job satisfaction has been broadly investigated in literature. Job satisfaction is the extent of one's happiness with his or her job. Simply, job satisfaction can be defined as one's positive feelings toward his or her job. More specifically, Locke (1969) defined job satisfaction as "the pleasurable emotional state resulting from the appraisal of one's job as achieving or facilitating one's job values". Spector (1997) defined job satisfaction as "the extent to which people like their jobs". Consequently,

job satisfaction is proposed as one's general or global affective reaction to his or her job itself.

According to Weiss et al. (1967), satisfaction has three main classes: intrinsic, extrinsic, and general satisfaction. Rose (2001) defined intrinsic satisfaction as the apparent reward from the job itself while extrinsic satisfaction is defined as the monetary compensation or other rewards. Intrinsic satisfaction and extrinsic satisfaction form a measure of general job satisfaction (Weiss et al., 1967).

Antecedents of Job Satisfaction

The antecedents of job satisfaction have been studied widely in management literature. Many researchers had proposed the more satisfied workers as the better performers in organizations. Hence, the antecedents and the determinants are essential if organizations want more satisfied employees. Three perspectives are related to job satisfaction: individual, organizational, and job-related factors (Yang, 2010). Yang (2010) found that role conflict, burnout, socialization, and work autonomy significantly predicted job satisfaction.

Career management, one of the most important issues in human resources, is essential to organizations. Organizations that invest in career management are more likely to increase employee‟s job satisfaction (Lee, 2000). Here we proposed that individual and organizational career management have effects on job satisfaction.

However, there are few studies concerning about the relationship between these two variables.

Consequences of Job Satisfaction

Many experts, managers as well as researchers believe that increasing employee job satisfaction will improve performance and productivity (Eslami and Gharakhani, 2012). A lot of studies have been put focus on the effects of job satisfaction on organizational commitment and turnover intention (Aydogdu and Asikgil, 2011; Igbaria and Guimaraes, 1993). Yang (2010) also found that job satisfaction significantly contributed to psychological outcomes in terms of organizational effectiveness (i.e., greater affective and continuance commitment and lower employee turnover intentions). Baker (2004) proposed two major consequences of job satisfaction, namely absenteeism and turnover.

Unlike the previous studies mainly focusing in performance or productivity, we propose that job satisfaction has positive effects on organizational commitment which in turn has positive effects on performance. A great deal of attention has been given to organizational commitment in many studies (Allen and Meyer, 1990). Eslami and Gharakhani (2012) used a questionnaire survey approach to confirm that three factors of job satisfaction all have positive impacts on organizational commitment.

Research Methodology

Conceptual Model and Hypotheses

The conceptual model of this study consists of two antecedents and one consequence of job satisfaction as shown in Figure 3.1. We propose that either career management on the individual level or on the organizational level help to improve employees' job satisfaction, which in turn bring higher level of organizational commitment among employees.

Figure 3.1 Research Framework

Hence, the research hypotheses are presented as follows.

H1: Individual career management will positively affect job satisfaction.

H2: Organizational career management will positively affect job satisfaction.

H3: Job satisfaction will positively affect organizational commitment.

Sample and Data Collection

Company X, a leading automobile component manufacturer in Taiwan, was established in 1971. Currently, the company has a total of 1,400 employees in over 10 factories both in Taiwan and China. As the headquarter office is still located in

Taiwan, employees in Taiwan are selected as participant for convenient sampling. Questionnaires were delivered to 300 participants with the assistance of the Personnel Management Department in January, 2012. By the end of February, 205 questionnaires were collected. However, 70 questionnaires were invalid, leaving 135 valid ones. The valid response rate was 45.0 %.

Measures

The survey questionnaire is composed of five parts. Part 1 measures the core concept of this study – job satisfaction. Part 2 and 3 measure two influencing factors of job satisfaction namely individual career management and organizational career management. Part 4 measures organizational commitment which is deemed as one outcome of job satisfaction. Questions of these four sections are measured with 5-point Likert scales. Demographic questions are listed in Part 5.

Job satisfaction is measured with a 20-item scale derived from the Minnesota's Satisfaction Questionnaire (short form) developed by Weiss et al. (1967). Intrinsic satisfaction and extrinsic satisfaction are two sub-constructs of job satisfaction. *Individual career management* is measured with 11 items developed by Orpen (1994). Two sub-constructs namely career planning and career tactics are measured. *Organizational career management* is measured with a 24-item scale developed by Yahya et al. (2004). Career management policies, career management,

and career information are three dimensions being measured with the scale. *Organizational commitment* is measured with the original 18-item scale developed by Allen and Myer (1993). Three subscale measuring affective commitment, continuance commitment, and normative commitment with 8 items for each one.

Demographic questions include gender, age, marital status, number of working years, job position, annual income, etc. which are listed in the final part of the survey questionnaire.

Statistical Analysis

The present study utilizes SPSS to conduct a series of statistical analyses. First, general information of respondents is revealed with frequency and percentage of sample characteristics. Secondly, Cronbach's alpha coefficient and inter-item correlations are computed to ensure internal consistency of data. Thirdly, Pearson correlations are computed to see if relationship between constructs exists. Finally, either simple or multiple regression analyses are employed to test the linear relationship between constructs.

Analysis and Results

Demographic Profile of Respondents

According to the descriptive statistics shown in Table 4.1, the sample has a total of 135 respondents, 81.5% of which is male, 52.6% of which is single, 62.2% of

which is at the age between 25 and 34, 58.8% of which had 1 to 5 working years, and 55.6 % of which has an annual income ranging from 360,000 to 600,000.

Reliability Analysis

Cronbach's alpha coefficient and item-total correlations are computed to ensure internal consistency of data. Cronbach's alpha coefficient is considered acceptable with a value of 0.70

Table 4.1 Demographic profile of respondents

Category	No.	Percentage	Category	No.	Percentage
Gender			Marital Status		
Female	25	18.5%	Single	71	52.6%
Male	110	81.5%	Married	64	47.4%
Age			Number of Working Years		
Less than 24	8	5.9%	Less than 1 year	2	1.5%
25 to 34	84	62.2%	1 to 5	79	58.5%
35 to 44	28	20.7%	6 to 10	22	16.3%
45 to 54	14	10.4%	11 to 15	18	13.3%
More than 55	1	0.8%	16 to 20	10	7.4%
Job Position			More than 21	4	3.0%
Senior Managers	2	1.5%	Annual Income (NTD)		
Middle Managers	8	5.9%	Less than 360,000	42	31.1%
Operational Managers	20	14.8%	360,000 to 600,000	75	55.6%
Staff	105	77.8%	More than 600,000	18	13.3%

and higher suggested by Hair et al. (1998). Items with low item-total correlations were deleted. Table 4.2 displays the Cronbach's alpha coefficient for each scale.Descriptive Statistics and

Correlation Analysis

Table 4.3 reveals the means and standard deviations of research variables. Also, the Pearson correlation coefficients between variables were computed. Strong correlations were confirmed between job satisfaction and individual career management, between job satisfaction and organizational career management, and between job satisfaction and organizational commitment.

Table 4.2 Reliability analysis of survey scales

Scale		No. of Items	Cronbach's alpha	
Job Satisfaction	Intrinsic Satisfaction	10	.902	.929
	Extrinsic Satisfaction	7	.896	
Individual Career Management	Career Planning	4	.820	.870
	Career Tactics	5	.836	
Organizational Career Management	Career Management Policies	5	.873	.947
	Career Management	9	.916	
	Career Information	3	.842	
Organizational Commitment	Affective Commitment	3	.850	.876
	Continuance Commitment	5	.846	
	Normative Commitment	6	.827	

Table 4.3 Descriptive statistics and correlations (N=135)

Variables	Means	S.D.	JS	ICM	OCM	OC
Job Satisfaction (JS)	3.314	.580	1			
Individual Career Management (ICM)	3.639	.492	.395**	1		
Organizational Career Management (OCM)	3.044	.631	.668**	.345**	1	
Organizational Commitment (OC)	3.097	.547	.627**	.150	.470**	1

** p <0.01 Two-tailed tests.

Regression Analysis

A series of regression analyses are performed to test the research hypotheses. Table 4.4 shows the results. Hypothesis 1 proposes that individual career management has positive effects on job satisfaction. A simple regression analysis is conducted and the result indicates that 15.6% of the variance (R-square) in job satisfaction has been explained by individual career management. F-value is 24.561 at $p<0.01$ level which empirically supports Hypothesis 1. For Hypothesis 2 arguing a significantly positive relationship between organizational career management and job satisfaction, a simple regression analysis is performed as well. The result shows that 44.7% of the variance (R-square) in job satisfaction has been explained by organizational career management. F-value is 107.447 at $p<0.01$ level which empirically supports Hypothesis 2. Hypothesis 3 argues that job satisfaction has positive effects on organizational commitment. Another simple regression analysis is used to confirm the relationship. R-square is 0.393 which proposes that 39.3% of the variance in organizational commitment can be significantly explained by job satisfaction. Consequently, we conclude that individual career management and organizational career management can be deemed as two important antecedents of job satisfaction. Organizational commitment as the consequence of job satisfaction is confirmed as well.

Table 4.4 Regression analysis between individual career management and job satisfaction

Hypothesis	Independent Variable	Dependent Variable	R-square	Adjusted R-square	F	Sig. F.
H1	Individual Career Management	Job Satisfaction	.156	.150	24.561	.000**
H2	Organizational Career Management	Job Satisfaction	.447	.443	107.447	.000**
H3	Job Satisfaction	Organizational Commitment	.393	.388	85.997	.000**

** p<0.01

Discussion and Conclusions

This study is aimed to verify two antecedents and one consequence of job satisfaction as proposed in our research framework (Figure 3.1). A total of 135 respondents were collected from a automobile component manufacturer in Taiwan. According to the results, individual and organizational career management had been found to be two influencing contributors of job satisfaction. In addition, job satisfaction had been found to be an essential factor in enhancing organizational commitment. Thus, three Hypotheses are supported.

For Hypothesis 1 and 2, we argue that individual career management and organizational career management have positive effects on job satisfaction. Simple regression analyses were conducted to test the hypotheses separately. The results indicated both linear relationships were confirmed. For Hypothesis 3, the results supported that job satisfaction have positive effects on organizational commitment

through a simple regression analysis. Consequently, organizational commitment as an outcome of job satisfaction is verified.

Based on the research results, there are at least two implications for practices. First, career management either in individual level or organizational level is important in achieving higher level of job satisfaction. The respective R-square 0.156 and 0.447 for Hypothesis 1 and Hypothesis 2 indicated that a higher percentage of the variance (R-square) in job satisfaction had been explained by organizational career management. Organizational career management is more important in influencing job satisfaction.

Second, job satisfaction is found to have positive impacts on organizational commitment. The higher level of job satisfaction of employees, the higher level of organizational commitment they will possess. The higher level of organizational commitment of employees, the less turnover intention they will have.

In summary, the integrated framework outlining two antecedents and one consequence of job satisfaction was supported by three respective regression analyses.

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TRAVEL REVIEW WEBSITES AS INNOVATIVE MARKETING VENUES FOR HOTELS

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Abstract

The study investigated travel review websites as innovative marketing venues for hotels through a qualitative case study of TripAdvisor, with particular focus on the top ten hotels in Las Vegas for 2012. The results showed that TripAdvisor is an important venue for online WOM marketing of hotels. The referral effect of reviews is strong. Actual bookings after reading the reviews are highly likely. No evidence of false reviews emerged from the top ten hotels in Las Vegas for 2012. As such, hotels should seriously consider TripAdvisor as a place to influence the expectations, perceptions, hotel choices of consumers and the way of innovative marketing strategy for attracting potential customers.

Keywords: online word-of-mouth (WOM) marketing, travel review websites, consumer generated content, travel decision-making, online trust, opinion leadership

Introduction

Travel review websites are venues for customers to publish hotel reviews, which can be positive or negative. Reviews depend on the hotel experience of customers. It is important for hotels to create a satisfying experience for customers, to encourage positive feedback (Bechwati & Nasr, 2011).

Using travel review websites for marketing involve limitations. Reviews of a hotel vary because of differences in taste and preferences as well as expectations of hotel customers (Lin, 2011). Customers can give differing feedback on a similar hotel experience. As such, hotels only have partial influence on reviews via service delivery, which encompasses booking, actual service and after sales service.

With the expectation of getting positive and negative reviews, it is important for hotels to monitor these reviews in order to strengthen the excellent aspects of the hotel service as well as respond to or consider improvements based on unsatisfactory feedback (Karakaya & Barnes, 2010). Presence in travel review websites allows hotels to understand customer demands and show their intention of prioritizing their customers (*The changing face*, 2010).

Many people use travel review websites for travel planning and review sharing. Around 75% of online travelers use at least three travel review websites before finalizing booking arrangements plans (Hotel News Resource, 2011). TripAdvisor is a

leading travel review website, in terms of the hotels reviewed, reviews posted and users. Website traffic offers marketing opportunities for hotels through the word-of-mouth reviews of hotel customers.

Recently, complaints about false reviews over content posted on TripAdvisor are coming from some hotels (Cochrane, 2011). Small hotels are complaining about reviews based on unreasonable expectations, given the descriptions and offers made by the hotel. Some negative reviews are attributed to false claims coming from competitors. On its part, TripAdvisor asserts that it is applying measures to identify and control false reviews.

TripAdvisor continues to become a popular information source for travelers. Hotels benefit from a boost in their reputation by positive reviews and ratings. While hotels cannot prevent negative reviews, they will not get any headway in ignoring the website. It becomes important for hotels to understand TripAdvisor as a marketing venue and the manner they can maximize the benefits and control the downsides. Understanding the impact of the possibility of false reviews on marketing outcomes can help hotels handle this issue better.

Literature Review

Online Word-of-Mouth (WOM) Marketing Theory

WOM marketing theory has evolved with the development of virtual communities and online social networks. The volume of information shared online and the number of people looking for information on the web has grown (Berger & Schwartz, 2011). Networking tools emerged to facilitate communication between business firms and customers, which resulted to exchanges of information and influence (Godes, 2011). The network coproduction model emerged to explain these developments better than the organic and linear marketing models (Kozinets, de Valck, Wojnicki &Wilner, 2010). The organic model considers WOM as an indirect marketing tool, with the outcome not measurable because firms have no direct influence on the exchanges between customers. With the Internet, the linear marketing model explained WOM as occurring with the influence of business firms through marketing offers or promotions communicated to consumers. With this influence, it is up to consumers to share information to other people within their reach. Interactive online tools enabled firms to communication directly to customers and customers to communicate back as well. Based on the network coproduction model, online WOM marketing involves direct two-way communication with customers to control influence and measure outcomes (Kozinets et al., 2010).

Controlling firm influence on the market necessitates an understanding of WOM marketing as grounded on experience, a consequence of marketing offers, and

the target of promotional campaigns (Bughin, Doogan & Vetvik, 2010). Business firms control their influence on customers by delivering a product or service that matches or exceeds the expectations of buyers. Consumers are more inclined to share their experiences of a product when their expectations are exceeded or unmet (Lee & Romaniuk, 2009). The benefit to firms is greatest when customers share positive experiences. Firms can also control their influence on customers through messages in their marketing campaigns (Bughin et al., 2010). Customers share their perception of products and brands based on the messages they receive from advertisements and other promotions. Clear and compelling messages that reinforce products and brands result to strong market influence. Enterprises can also manage their influence on consumers by developing promotional campaigns that directly target WOM marketing (Bughin et al., 2010). Endorsements by celebrities, sponsorship of popular events, new product launch, or new store branch opening are campaigns that stir talk among customers and directly influence WOM marketing.

Measuring outcomes is an important part of the marketing process. Measures of online WOM marketing outcomes can be through its dimensions, which are intensity, negative valence, positive valence and content (Goyette, Ricard, Bergeron & Marticotte, 2010). With well-planned use, online WOM marketing can attract customers to raise revenue. A study (Trusov, Bucklin & Pauwels, 2010) on the

monetary benefit from online WOM marketing showed longer carryover effects relative to traditional marketing to support sustained revenue generation. Customers influenced through online WOM marketing contribute to customer equity by making repeat purchases and influencing the decision-making of other customers (Liu & Zhang, 2010).

Online WOM Marketing in Travel Review Websites

Travel review websites facilitate online WOM marketing by hosting consumer-generated content (CGC) from the personal opinions and experiences of travelers (Bronner & de Hoog, 2011). In a study of WOM and buying behavior, Xiaofen and Yiling (2009) found that CGC supported online WOM marketing through its referral effect. CGC, in the form of reviews, influence consumers by making direct and indirect recommendations on products. Moreover, several studies found that the extent of referral effect depends on perceived usefulness (Liu & Zhang, 2010), degree of online trust (Hsiao, Lin, Wang, Lu & Yu, 2010), role of opinion leaders (Xiaofen &Yiling, 2009), and quality and quantity of reviews (Karakaya & Barnes, 2010).

Customer feedback can have varying degrees of importance to online travelers. According to Liu and Zhang (2010), customer feedbacks that are expressed online have the strongest influence on the travel decisions of first-time travelers and travelers who found customer feedback to be effective in the past.

Trust on CGC in travel review websites is a significant determinant of referral effect. In a study of online product recommendations, Hsiao et al. (2010) reported that referrals are positively correlated to trust towards reviews, which depend on website factors such as reputation, quality and institutional assurance together with network factors such as perceived ability, perceived integrity, and perceived critical mass. Trust on reviews also relies on reviewer integrity and ability to give experience-based feedback. Perceived trustworthiness of the website also influence the trust extended to reviews posted on the site. In a similar study, Burgess, Sellitto, Cox and Buultjens (2011) stated that people place more trust on feedback from travel agents and travelers on third party sites dedicated to travel. In a more recent study on the credibility of online reviews, Kusumasondjaja, Shanka and Marchegiani (2012) found that when the reviewers' identity are shown, negative reviews are deemed credible and positive reviews are considered trustworthy. The extent that travel review websites encourage contributors to sufficiently identify themselves, such as by name, age, and country of residence, determine the degree of influence of reviews on readers.

Opinion leaders are targets of online WOM marketing activities. Xiaofen and Yiling (2009) reported that the message impressions of opinion leaders influence other consumers by directing their attitude towards particular brands and the intention

to make actual purchases. Edison and Geissler (2011) explained that opinion leaders are mavens, who are experts in technology and experienced in travel and who post positive and negative reviews more frequently than other customers, and reach more people. Mavens exhibit greater risk-taking and individualism, which reinforce their reputation as experts to lead more people to seek information from them. Furthermore, the study (Edison & Geissler, 2011) recommends that firms should monitor comments from opinion leaders and address negative feedback.

The quality and quantity of reviews also determine referral effect. Karakaya and Barnes (2010) explained that reviews about customer care comprise quality travel feedback because information on this particular aspect of the travel experience is highly sought by customers. As such, feedbacks on customer care strongly influence customer opinion, engagement and selection (Lin, Lee & Horng, 2011). Furthermore, customer care is an aspect of the travel experience that travel firms cannot easily describe, so that consumers primarily get ideas from customer reviews. Hsiao et al. (2010) provides that critical mass or the number and frequency of reviews influence purchasing intention, which is an effect of referrals. Most travel customers yield to the path of least resistance in making decisions based on common and recurring feedback (Lin, 2011).

Role of Travel Review Websites in Online Travel Planning

Travel planning via the Internet involves three activities, which are recognizing the need for travel, searching for a destination and related travel arrangements, and evaluating various options (Xiang & Gretzel, 2010). Travel reviews support travel planning. Travel reviews provide experience-based information that could shift the perceived need for travel of consumers (Hvass & Munar, 2012). In a study of the influences of online comments, Burgess, Sellitto, Cox and Buultjens (2009) reported that consumers tend to gravitate towards these extreme reviews, which are perceived to be realistic and credible. This finds support from a latter study (Moe, Schweidel & Trusov, 2011), which explained that reviewers shared their extreme experiences more, such as outstanding and unsatisfactory events. Extreme positive reviews can influence the need for travel of consumers while extreme negative reviews can dampen previous considerations to travel. Reviews also simplify and speed-up decision-making by providing readily accessible information that other customers perceive to be useful (Jiang, Gretzel & Law, 2010).

Online WOM Marketing Outcomes for Hotels Listed in Travel Review Websites

Reviews can influence the marketing outcomes of hotels. Tuominen (2011) explained the correlation of hotel performance with the number of reviews and the ratings. More positive reviews and higher ratings reflect good performance by hotels. More negative reviews and low ratings indicate bad performance. Ye, Law, Gu and

Chen (2011) reported on the substantial effect of traveler reviews on the increase in online sales of hotels, which can be as high as 10 percent from around 5 percent rise in bookings. In a study of the impact of customer reviews on buying behavior, Yayl and Bayram (2012) identified the consultation of customer reviews as a significant antecedent of actual purchases. A research (Yacouel & Fleischer, 2012) on the role of cybermediaries in the online hotel market showed that online intermediaries, especially online travel agents, and information from customers on their websites can affect hotel reputation.

However, fake reviews could affect marketing outcomes depending on the effect on customer perceptions of credibility, reliability and trustworthiness. Yoo and Gretzel (2009) identified distinctions in lexicon, particularly use of first person pronouns, mention of brand names and sentiments, as factors useful in identifying false reviews. O'Connor (2010) reported little evidence of false reviews of hotels in travel review websites even with negative feedback and recommended that hotels should actively participate in addressing negative comments. Negative comments are not necessarily fake reviews. As such, hotels should be vigilant in considering negative feedback to determine the proper response (Yoo & Gretzel, 2009; O'Connor, 2010).

Methodology

Qualitative case study is the selected research design for the study on TripAdvisor as a marketing venue for hotels. According to Baxter and Jack (2008), a qualitative case study supports the investigation of "complex phenomena within their context" (p. 544). Marketing through a travel review website is a complex area of study because of the many parties and influencing factors involved that could lead to different outcomes depending on context. In the case of travel firms, particularly hotels, studies on firm experiences with online WOM marketing in travel review websites are limited. There is need for research on the actual experiences of hotels in online WOM marketing through travel review websites. This research design also involves the investigation of a phenomenon using various sources of data (Creswell, 2009). The phenomenon under investigation is TripAdvisor as a marketing venue for hotels.

Observations of hotel pages on TripAdvisor together with secondary research were the methods used in collecting data. Both primary and secondary sources of data were used in the study. Primary data was collected from the TripAdvisor website include raw review statistics, review content and reviewer information on the top ten hotels in Las Vegas, Nevada for 2012. Reviews of these hotels provided rich data for investigation. The selected top hotels in this popular location are likely to be direct competitors catering to a wide range of travelers and receiving large volumes of

positive and negative feedback. This provides a common context for analyzing reviews and serves as the basis for comparing feedbacks on hotels. Secondary data came from the statistical analysis of Las Vegas hotels reported by TripAdvisor on its website together with relevant articles and reports found in books, journals, magazines, newspapers, and online databases.

The data collected were subjected to content analysis, pattern identification and cross-case comparison as data analysis methods. These methods resulted to an evaluation of TripAdvisor's support for online WOM marketing, referral value of reviews, and the issue of false reviews in the case of hotels.

Findings

TripAdvisor for Online WOM Marketing

TripAdvisor is reported to be the leading travel review website worldwide by having five times more review postings than other similar sites. While it is not the oldest travel review site, it supports more languages to make it useful to travelers from 30 countries. Around 45 million visits to the website resulted to reviews of 495,000 hotels. The website format supports overall hotel rating, sub-ratings, special rankings and recommendations. The role of TripAdvisor management in the postings is to respond to problems with the reviews reported by customers and firms. (Olery,

2012) These features and functions of TripAdvisor support online WOM marketing of hotels.

Summary of the reviews of the top ten hotels in Las Vegas for 2012 describe the extent of marketing support provided by TripAdvisor to hotels as shown in Table 1. Some hotels gained 2.5 stars while others achieved 5-star status. Medium and large hotels can establish their brands on TripAdvisor. All the hotels received a 4.5 overall rating on TripAdvisor. Presence of the hotels on TripAdvisor varied, with the earliest review on Four Seasons in February 2003. Mandarin Oriental and La Quinta Inn & Suites, which are more recently launched hotels, received their first reviews in 2009 and 2010, respectively. Nevertheless, all the hotels have been receiving reviews for more than a year.

The intensity of reviews determines the extent of support for online WOM marketing (Goyette et al., 2010; Karakaya & Barnes, 2010). The total reviews received by hotels indicated intensity. La Quinta Inn & Suites received the lowest number of reviews at 141, which is likely due to its position as a new entrant. Wynn hotel received the highest number of reviews, at 4,014, as a more established 5-star hotel. On the average, Staybridge Suites gained the lowest number at 7.2 reviews per month, which means that around 7 people are posting new reviews of the hotel per

Table 1. Summary of Reviews of the Top 10 Las Vegas Hotels 2012 on TripAdvisor

Top 10 Las Vegas Hotels for 2012	Hotel Class (stars)	Overall Rating	Start of Reviews	Total	Average Monthly Reviews	Review Classification		
						Positive	Average	Negative
1 Mandarin Oriental	5.0	4.5	Dec 2009	730	26.1	684 (93.7%)	31 (4.2%)	15 (2.0%)
2 Four Seasons	5.0	4.5	Feb 2003	1268	11.6	1172 (92.4%)	62 (4.9%)	34 (2.7%)
3 Platinum Hotel & Spa	4.0	4.5	Nov 2006	1443	22.5	1333 (92.4%)	65 (4.5%)	45 (3.1%)
4 Staybridge Suites	3.0	4.5	Nov 2008	289	7.2	273 (94.5%)	9 (3.1%)	7 (2.4%)
5 La Quinta Inn & Suites	2.5	4.5	Nov 2010	141	8.8	131 (93.0%)	5 (3.5%)	5 (3.5%)
6 Red Rock Casino Resort & Spa	5.0	4.5	May 2006	1434	20.5	1240 (86.5%)	70 (4.9%)	124 (8.6%)
7 Desert Rose Resort	3.0	4.5	Mar 2004	2395	24.9	2199 (91.8%)	101 (4.2%)	95 (4.0%)
8 Signature at MGM Grand	4.5	4.5	Jun 2006	3848	55.7	3474 (90.3%)	197 (5.1%)	177 (4.6%)
9 Encore at Wynn	5.0	4.5	Dec 2008	2291	58.7	1957 (85.5%)	147 (6.4%)	187 (8.17%)
10 Wynn	5.0	4.5	Apr 2005	4014	42.2	3283 (81.8%)	290 (7.2%)	441 (11.0%)

month. Encore at Wynn has the highest average at 58.7 reviews per month followed by Signature at MGM Grand with 55.7 reviews per month. Variance in the intensity of reviews depends on the industry position of the hotels as early or late entrants, with earlier entrants receiving higher average monthly reviews. At the same time, the intensity of reviews also depends on the marketing offers of the hotels. Encore at Wynn and Signature at MGM Grand, the two hotels receiving the highest average monthly reviews, are 5-star hotels offering a variety of popular shows and activities as well as complete amenities. These service offers attract travelers as well as influence

repeat purchases (Trusov et al., 2010). The positive and negative valence of reviews also determines support for online WOM marketing (Goyette et al., 2010). In classifying the hotel reviews into positive, average and negative, 6 of the hotels received higher than 90 percent positive ratings and the remaining 4 hotels received less than 90 percent but greater than 80 percent positive ratings. Staybridge Suites received the highest positive rating of 94.5%. All the hotels received not more than 10 percent average ratings. Seven hotels received less than 5 percent negative ratings while the other 3 hotels received more than 5 percent negative ratings. Wynn hotel received the highest number of reviews and it also gained the highest number of negative reviews at 11.0%.

Overall, the reviews significantly lean towards positive valence for all hotels. Most reviewers were satisfied with their hotel experience. Their reviews serve as direct or indirect recommendations of the hotel. However, there were also those who were not satisfied. Their reviews point to considerations for other customers in making hotel choices as well as identify areas for improvement in the marketing offers and service delivery of hotels.

Referral Effect of Hotel Reviews on TripAdvisor

The referral effect of hotel reviews (Xiaofen & Yiling, 2009) explains the role of TripAdvisor as an online marketing venue for hotels. Helpful votes (HVs) received

by hotel reviews indicate referral effect. When a customer posts a review, readers have the option to indicate whether the review was helpful to them. A summary of the number and characteristics of helpful votes for reviews of the ten Las Vegas hotels is shown in Table 2.

Table 2. Characteristics of Helpful Votes (HVs)

Top 10 Las Vegas Hotels	Total Helpful Votes (HVs)	Average HV per Review	Reviews w/ ≥5 HVs	Source of HV			Opinion Leaders (OLs)	
				Positive Reviews	Average Reviews	Negative Reviews	Total OLs	HV Received
1 Mandarin Oriental	1271	1.7	31 (4.2%)	1100 (86.5%)	81 (6.4%)	90 (7.1%)	166 (22.7%)	302 (23.8%)
2 Four Seasons	4359	3.4	217 (17.1%)	3558 (81.6%)	308 (7.1%)	493 (11.3%)	329 (25.9%)	1015 (23.3%)
3 Platinum Hotel & Spa	2313	1.6	100 (4.3%)	1985 (85.8%)	123 (5.3%)	205 (8.9%)	207 (14.3%)	345 (14.9%)
4 Staybridge Suites	440	1.5	16 (5.5%)	383 (87.0%)	21 (4.8%)	36 (8.2%)	61 (21.1%)	115 (26.1%)
5 La Quinta Inn & Suites	162	1.1	2 (1.4%)	141 (87.0%)	10 (6.2%)	11 (6.8%)	26 (18.4%)	28 (17.3%)
6 Red Rock Casino Resort & Spa	3564	2.5	169 (11.8%)	2791 (78.3%)	215 (6.0%)	558 (15.7%)	309 (21.5%)	558 (15.7%)
7 Desert Rose Resort	2724	1.1	121 (5.1%)	2196 (80.6%)	168 (6.2%)	360 (13.2%)	259 (10.8%)	403 (14.8%)
8 Signature at MGM Grand	11040	2.9	773 (20.1%)	9765 (88.5%)	513 (4.6%)	762 (6.9%)	751 (19.5%)	2122 (19.2%)
9 Encore at Wynn	3400	1.5	185 (8.1%)	2182 (64.2%)	366 (10.8%)	852 (25.0%)	451 (19.7%)	703 (20.7%)
10 Wynn	20832	5.2	1191 (29.7%)	14263 (68.5%)	1850 (8.9%)	4719 (22.6%)	779 (19.4%)	2914 (14.0%)

Utility to readers affect the referral influence of reviews (Liu & Zhang, 2010). Reviews of the top 10 Las Vegas hotels generated total HVs exceeding the number of reviews. On the average, a review generates at least 1 HV. Every review is useful to at least 1 reader. Wynn received the highest average HV per review at 5.2 followed by

Four Seasons receiving 3.4. One review of Wynn is useful to 5 people while every review of Four Seasons is useful to 3 people. Readers who find the reviews to be helpful are likely to consider the recommendations given by these reviews.

Higher number of HVs indicates greater referral effect. With 5 as the highest average helpful vote per review, consideration of the number of reviews receiving 5 or more HVs indicate variances across the top ten Las Vegas Hotels. La Quinta Inn & Suites has the least number of reviews receiving 5 or more HVs at 1.4% while Wynn has the most number of reviews with 5 or more HVs at 29.7%. Nearly 1 in 3 reviews of Wynn were helpful to 5 or more readers. Even with the wide gap, reviews of the hotels were useful to at least 1 reader and a significant percentage of reviews were useful to 5 or more readers.

Source of the HVs, which could be from positive, average or negative reviews, determines the usefulness of different types of reviews to readers. In total, there are more HVs generated by positive reviews because of more good reviews. However, the average and negative reviews generated more HVs than positive reviews. In the case of Red Rock Casino, HVs from positive reviews is more than twice the number of positive reviews, HVs from average reviews is more than three times the number of average reviews, and the HVs from negative reviews is more than 4 times the number of negative reviews.

All kinds of reviews are useful to readers. Positive reviews substantiate the marketing offers of hotels. Average and negative reviews provide unique information based on actual experiences that may or may not differ from hotel offers. After getting information on hotel offers, reading on the actual experiences of customers, especially the negative aspects, completes the information deemed useful to customers in considering hotel choice (Burgess et al., 2009; Kusumasondjaja et al., 2012). The referral effect of positive reviews rests more on intensity (Goyette et al., 2010) or critical mass (Hsiao et al., 2010) while the referral effect of average and negative reviews rests on provision of information on potential downsides and reinforcement of the integrity and trustworthiness of reviews (Lin, 2011; Lin et al., 2011).

Apart from the usefulness of reviews, opinion leaders also influence referral effect (Xiaofen & Yiling, 2009). Opinion leaders (OLs) on TripAdvisor are those with more travel experience. The website classifies reviewers into reviewer, senior reviewer, contributor, senior contributor and top contributor. Senior contributors are those who have posted 21-50 reviews while top contributors have posted 51 or more reviews. These comprise the opinion leaders on the website. The highest percentage of OLs is 25.9% in the case of Four Seasons while the lowest percentage is 10.8% in the case of Desert Rose Resort. On the average, the reviews of OLs generate at least 1 HV per review to as high as 3 HVs per review. The number of OLs posting reviews of

the top ten Las Vegas hotels is significant. They also generate a quarter of HVs at the most. However, even the reviews of non-opinion leaders generate HVs. While reviews of opinion leaders are significant (Edison & Geissler, 2011), experience of the hotel appears to influence the referral value of reviews regardless of experience as a traveler. Even first-time travelers can influence other customers on their hotel choice.

Content is another determinant of the referral effect of reviews (Goyette et al., 2010; Lin et al., 2011). The content of quality reviews cover aspects of customer care (Karakaya & Barnes, 2010). The common positive reviews and the negative reviews of the top ten Las Vegas hotels are shown in Table 3.

The hotels received common positive reviews. Many hotel customers praised the attentiveness, helpfulness, courteousness, and friendliness of the staff and expressed satisfaction with their rooms and hotel amenities and facilities. There are positive reviews unique to some of the hotels. A significant number appreciated the speedy check-in and check-out at the Mandarin Oriental. Some customers mentioned the ability of Platinum Hotel & Spa to accommodate special arrangements based on personal needs and preferences. A family hotel, Red Rock Casino Resort & Spa, received a number of reviews commending its provision of facilities and activities for children and adults as well as child supervision to allow parents to do their own

activities. Many reviewers agreed over the good complimentary breakfast together with helpful advice from the staff at Desert Rose Resort. The Wynn received compliments for its assistance on various activities such as concerts and tours for its customers. These positive aspects of the hotel

Table 3. Summary of Content of Hotel Reviews

Top 10 Las Vegas Hotels	Review Content	
	Positive	Negative
1 Mandarin Oriental	Fast check-in and check-out Efficient room service Complete amenities	Rooms not ready upon check-in Slow room service Difficulty getting upgrades Expensive extra charges
2 Four Seasons Hotel	Great service	Slow cleaning service Uncontrolled noise Expensive extra charges Unfriendly staff Slow response to requests No inquiries made about hotel stay
3 Platinum Hotel & Spa	Satisfactory room service Helpful staff Accommodation of special arrangements	Slow and poor room service Uncontrolled noise Erroneous billing
4 Staybridge Suites	Friendly and attentive staff Complete amenities	Uncontrolled noise Slow response to requests Insufficient staff
5 La Quinta Inn & Suites	Clean and comfortable facilities Friendly staff	Insufficient staff
6 Red Rock Casino Resort & Spa	Supervision of children's activities Facilities for children and adults Friendly and helpful staff	Slow and poor service Lack of assistance to requests Expensive additional charges Uncontrolled noise
7 Desert Rose Resort	Great advice and information from staff Complete amenities Good complimentary breakfast	Crowded Credit card information theft (2010-2011) Uncontrolled noise
8 Signature at MGM Grand	Complete facilities Courteous and helpful staff	Unhelpful staff Poor room service
9 Encore at Wynn	Attentive staff Complete amenities and facilities	Poor valet and room service Expensive additional charges
10 Wynn	Fast room service Complete amenities Diverse activities	Poor security, room theft (2010-2011) Slow service and response to issues Uncontrolled noise

service serve as referrals, especially to market segments seeking a particular aspect of service. Red Rock Casino Resort & Spa and Desert Rose Resort are primarily family hotels while Mandarin Oriental and Wynn are primarily business and couples hotels.

Some negative comments commonly appear in reviews of the top ten Las Vegas hotels. Slow or poor service, rude staff, uncontrolled noise, and expensive additional charges commonly emerge from negative reviews. These are some of the reasons for the low rating of hotel service. In considering the location of the hotels and the period when most of these negative reviews came out, some explanations emerged. Complaints about slow or poor service and rude staff emerged during peak seasons, when the hotels are full. Complaints of uncontrolled noise depend on the preferences of customers. Most business and family travelers are more concerned with noise coming from hotel bars or surrounding establishments at night while many couples and travelling friends are not. A mismatch between the preferences of customers and the hotel environment explain the noise complaint. Issues about expensive additional charges come from more price sensitive customers staying at 5-star hotels. Preventing these negative comments may not be possible. However, preparing the staff for the peak season, adjusting to customer preferences by transferring customers to more silent rooms, and ensuring excellent facilities when charging a separate resort fee, are ways for hotels to address these common complaints.

There are also complaints specific to a hotel. Problems with upgrades are complaints against Mandarin Hotel. Asking customers about their stay during check-out was a point raised as lacking at Four Seasons. Erroneous billing was a problem experienced at Platinum Hotel & Spa. Overcrowding and credit card information theft were issues raised by reviewers on the Desert Rose Resort page. Poor security and room theft were complaints made against Wynn. Complaints are also potential downsides in deciding on a hotel. However, customers may still select a hotel with negative reviews when advantages are greater than disadvantages. With awareness of these potential problems, customers can make the necessary action to prevent these complaints and discuss these issues with hotel management before or during their stay with the hotel. Some reviewers expressed not experiencing the customer complaints they read from other reviewers while some expressed regret in not heeding the complaints raised.

The information gained from considering both positive and negative reviews affect the referral value of reviews on hotel opinion and travel decision (Jiang et al. 2010; Moe et al., 2011). All reviews provide descriptions of things to expect from the hotel and reinforce the trustworthiness of reviews (Hsiao et al, 2010; Burgess et al., 2011; Lin et al., 2011).

Outcomes of Online WOM Marketing on TripAdvisor

Actual bookings and sales, as marketing outcomes, gained by hotels through reviews on TripAdvisor are difficult to quantify in exact terms because of the lack of precise measures of actual bookings on the website. However, a number of observations support the likelihood of hotel bookings made through the website.

All reviews include information on the reviewers, especially the date of stay at the hotel and the type of travel, which could be solo, as a couple, with family or for business. The total reviews received by a hotel can indicate the number of hotel bookings. Although not all reviewers may have booked through TripAdvisor, Liu and Zhang (2010) reported on the likelihood that many reviewers found other reviews to be useful in the past. It is likely that a significant number of reviewers used information on the website in making their decisions and then posted feedback on their actual experiences.

HVs come from readers of reviews. Voting for a review as helpful may not necessarily translate into actual hotel bookings. However, the reviews receiving helpful votes are likely to have influenced customer opinion and decision-making on hotel choice. The total helpful votes also can approximate the number of actual bookings generated by reviews on TripAdvisor.

Based on content, explicit and implicit recommendations from all reviews are also likely to influence actual bookings by readers. A number of reviewers indicated

having read other reviews before booking and found their actual hotel experience to be similar, different or opposite the experience of website contributors. Some of the reviewers also indicated repeat stays at the hotel or plans to stay at the hotel again. These are also indications of actual hotel bookings.

Positive reviews indicate actual bookings based on total number, especially since most of the hotel reviews rate their hotel experience as excellent or very good. However, negative reviews can also signify actual bookings. Negative reviews based on customer preferences serve as implicit referrals to particular market segments. An example is a reviewer, who traveled as a couple, complaining about uncontrolled noise from children in the pool. This review can serve as an implicit recommendation to those travelling with children even if it discourages couples and business travelers preferring a peaceful and quiet hotel environment. Another example is a reviewer travelling with friends who complained about limited facilities and activities in a hotel located a little far from the strip. This serves as a recommendation to travelers wanting a peaceful and relaxing environment even if it discourages travelers seeking a bustling Las Vegas experience.

Issue of Fake Reviews on TripAdvisor

The issue of fake reviews on TripAdvisor was considered from the perspective of reviewers, readers, and hotels. These perspectives were based on the lexical signals

from reviews, helpful votes gained by negative reviews, and the response of hotels as summarized in Table 4.

Reviewers' perspective emerges from lexical signals contained in the reviews posted. These signals can be used to identify possible fake reviews from real ones.

Table 4. Analysis of Negative Reviews and the Issue of Fake Reviews

Top 10 Las Vegas Hotels	Negative Reviews		Lexical Signals		Hotel Response to Reviews	Claim of False Review
	Total	Reviews w/ ≥5 HVs	Real	Fake		
1 Mandarin Oriental	15	7 (46.7%)	Common experiences Details	Names Competitors	None	None
2 Four Seasons Hotel	34	22 (64.7%)	Common experiences	Competitors	5 responses to the latest reviews, apology, thank you for the comment, contact with manager	None
3 Platinum Hotel & Spa	45	20 (44.4%)	Common experiences	Names Competitors	Responses to positive and negative feedback, expressed apology, expressed consideration of customer feedback and promise of improvements	None
4 Staybridge Suites	7	4 (57.1%)	Common experiences	None	None	None
5 La Quinta Inn & Suites	5	1 (20%)	Common experiences	None	Apology, contact regarding the complaint	None
6 Red Rock Casino Resort & Spa	124	35 (28.2%)	Common experiences	Names	Apology request to discuss comments	None
7 Desert Rose Resort	95	23 (24.2%)	Common experiences Details Similar feedback on different situations	Names	Apology for the credit card issue and explained actions being taken	None
8 Signature at MGM Grand	177	58 (32.8%)	Common experiences	Names Competitors	None	None
9 Encore at Wynn	187	81 (43.3%)	Common experiences	Names	None	None
10 Wynn	441	306 (69.4%)	Common experiences	Competitors	None	None

Signals that indicated the reviews were real include accounts of common experiences, similar experiences given different periods of stay and hotel arrangements, as well as use of details such as floor, room number, wall color, bathroom fixtures, music and food. Signals that can indicate false reviews are complaints about a single person, mostly managers, especially when many other reviewers say the opposite about that person together with outright recommendation of a competitor hotel without providing detailed reasons for referring the competitor over the hotel being reviewed. While these signals can be indicators of false reviews, the intention of some reviewers to post fake reviews in favor of competitors cannot be absolutely established.

Opinion of readers indicates trust towards reviews, especially negative reviews, on TripAdvisor. A significant number of negative reviews received 5 or more HVs from readers, which can be as low as 20% for La Quinta Inn & Suites or as high as 69.4% for Wynn. Many readers do not see negative reviews as fake, especially when the negative reviews are thorough in describing an unsatisfactory experience. Some reviewers who are complaining about an experience different from the reviews they read on the website imply that the authors may not have actually stayed at the hotel, stayed at the hotel for a very short time only, or have not experienced the services, amenities and facilities of the hotel. However, many of the differences in hotel experience can be explained by variances in expectations and personal preferences.

Perspective of hotels shows recognition of the credibility of the reviews. None of the top ten hotels in Las Vegas made claims that a negative review is false. Only half of the hotels read and respond to negative reviews. However, even those who read and respond to reviews have not made any direct or indirect claims of false review. Wynn received a succession of complaints about room theft in 2010 and 2011 but there was no allegation of these reviews as false. This could be because the hotel does not read reviews on TripAdvisor. Even Desert Rose Resort, which reads and responds to negative reviews, did not consider the series of credit card information theft complaints as fake. The hotel manager apologized for the incident and gave assurance of steps being done to ensure a secure credit card transaction with the hotel.

Conclusion

TripAdvisor is the leading travel review website. Hotel feedback generated by customers together with overall hotel ratings and sub-ratings provide information and recommendations to travelers to influence their hotel choice. By helping consumers make purchasing decisions, TripAdvisor becomes a significant venue for the online WOM marketing of hotels.

Consumer reviews posted on TripAdvisor support the online WOM marketing of hotels through the referral effect. The reviews make explicit and implicit recommendations on hotel choice, things to expect from a hotel, and things to watch

out for. A number of factors determine the referral effect of reviews. First, the utility of reviews to readers indicate the influence on hotel choice. From the reviews of the top ten Las Vegas hotels for 2012, a review is useful to at least 1 reader on the average. All kinds of reviews are useful to readers. Positive reviews influence readers through sheer number, since there are more positive reviews. Average and negative reviews influence consumer expectations and opinions as well as reinforce the integrity and trustworthiness of reviews. Second, intensity of reviews also indicates referral value. Consideration of the same Las Vegas hotels shows one hotel receiving 7 reviews per month and another hotel receiving 58 reviews per month, depending on entry into the industry and marketing offers. More established hotels receive more reviews per month than newer hotels. Hotels with a wide range or variety of marketing offers receive more reviews. Third, opinion leaders also determine the influence of reviews. Opinion leaders are those who contributed at least 21 reviews on the site. Reviews of opinion leaders are useful to many readers but even first-time reviewers can also influence readers, depending on the information shared. Fourth, quality content that covers aspects of customer care also influences readers. Reviews of the Las Vegas hotels indicate common and unique feedback. Common positive feedbacks reinforce hotel offers. Unique positive feedbacks differentiate the hotels.

Common negative feedbacks comprise the downsides in selecting a hotel. Unique negative feedbacks are special considerations in deciding on a hotel.

Actual bookings made through the website are difficult to measure. However, indications of actual bookings emerge from a number of factors. The total number of reviews and total helpful votes approximate actual hotel bookings. Actual mention of past, present and future bookings in reviews also indicate actual bookings.

False review of hotels on TripAdvisor is unsubstantiated based on the reviews of the top ten hotels in Las Vegas. Las Vegas creates a competitive atmosphere for hotels. However, consideration of the perspective of reviewers, readers and hotels shows no absolute evidence of false reviews. Even serious complaints in negative reviews, such as credit card information theft and room theft were not considered false by readers and hotels.

TripAdvisor is an important venue for online WOM marketing of hotels. The referral effect of reviews is strong. Actual bookings after reading the reviews are highly likely. No absolute evidence of false reviews emerged from the top ten hotels in Las Vegas for 2012. As such, hotels should seriously consider TripAdvisor as a place to influence the expectations, perceptions and hotel choices of consumers.

Recommendations

The key to using TripAdvisor in online WOM marketing is to set-up a page on the website by supplying the hotel name, address, picture and videos, contact information, booking links, and offers. This establishes the presence of the hotel on the website. The next important thing is to monitor reviews and reviewers to understand customer demands better and determine customer response to marketing offers. The last step is to participate in the reviews by responding to positive, average and negative reviews, especially to negative reviews of the hotel. Negative reviews are valuable to readers and responding to complaints reinforces customer care and the value of customers to the hotel. Responses should be more personal to indicate that the hotel has read the review and appreciated the effort of the reviewer. Even without substantial evidence, hotels can address the possibility of false reviews by investigating the incidents described in negative reviews and responding accordingly. If complaints are deemed truthful, these comprise the areas for improvement in hotel service. In case of false reviews, such as having no record of the reviewer as a customer of the hotel or unlikely events and conditions contained in the reviews, hotels can use the function on the website for reporting problems with reviews as well as making a clear statement as response to the review.

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International Journal of Organizational Innovation

EFFECTS OF COMPUTER-ASSISTED INSTRUCTIONS ON LOGISTIC THINKING AND CREATION CAPABILITY: A CASE STUDY ON G1 PUPILS USING *E-BOOKS*

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Abstract

Computers are regarded as one of the most practical and necessary daily tools in human technology development, as they could present diverse information, interact and provide feedback for students, and create different Instructional management. Computers therefore are considered as a valuable Instructional media. A lot of research indicated that Computer-Assisted Instructions could enhance Logistic Thinking of students and promote learning achievements. Moreover, Ministry of Education has largely promoted the information-integrated instructions, expecting to have students learn more flexible knowledge through such instructions. For this reason, this study aims to discuss the relations among Computer-Assisted Instructions, Logistic Thinking, and Creation Capability. The research outcomes show that 1. Computer-Assisted Instructions appears significantly positive effects on Logistic Thinking, 2. Creation Capability shows remarkably positive effects on Computer-Assisted Instructions, 3. Creation Capability presents notably positive effects on Logistic Thinking, and 4. Creation Capability reveals significantly moderating effects on the relations between Computer-Assisted Instructions and Logistic Thinking. Finally, the research outcomes are expected to provide reference for schools to effectively implement Computer-Assisted Instructions with E-books.

Key words: Computer-Assisted Instructions, Logistic Thinking, Creation Capability, Teaching Innovation

Introduction

With computers as the teaching media, Computer-Assisted Instructions help teachers in instructions and assist students in learning materials to achieve the programmed instructions of individualization, remedial teaching, and mastery learning. Besides, Computer-Assisted Instructions could present abstract concepts with visual images, helping students understand and connect knowledge and concepts through computerized practice. Computer-Assisted Instructions therefore are gradually emphasized. Moreover, Computer-Assisted Instructions allow students to repeatedly practice which solves the problem of abundant practice, save the instruction time for teachers, and break the restriction of learning places. In this case, Computer-Assisted Instructions are suitable for being applied to reading instructions for students with difficulty in logistic thinking. With the emergence of Internet, parents could simply acquire parent-child information by browsing the Internet. Besides, the global popularity of E-books and the solving of privacy and pay problem of App Store have E-books become a new option in Computer-Assisted Instructions. For instance, Tower School, a private elementary school in Marblehead, Massachusetts, the USA, appears the situation of every student operates an E-book in classes, as Computer-Assisted Instructions are implemented and now expanded to several courses. Computer-Assisted Instructions with E-books combine tradition and

modern and satisfies the information share and collaborative study between teachers and students. This study aims to discuss the effects of the active images, bright colors, and texts and sound in Computer-Assisted Instructions on the comprehension of articles for students with difficulties in logistic thinking.

Literature Review

Computer-Assisted Instructions

In the past thirty years, Computer-Assisted Instructions have been defined by many domestic and international researchers (Lin, 2009; Wang, 2010; Chiu, 2008; Shih, 2011; Huang, 2010; Huang, 2009; Hick & Hyde, 1973; Chambers & Sprecher, 1983; Sipple & Sipple, 1980; Steinberg, 1991; Mercer & Mercer, 1998).

Based on the objectives of learning units and learners' characteristics, Computer-Assisted Instructions are the computerized materials providing interactive, feedback, recording, and individualized learning environment, including the types of Drill-and-practice, Tutorial, Problem solving, Simulations, and Games (Chen, 2009; Mayes, 1992; Olson & Platt, 1992; Merrill, P. F., Hammons, K., Vincent, B. R., Reynolds P. L., Christensen, L. & Tolm. M. N., 1995). (1) Drill-and-practice in Computer-Assisted Instructions emphasizes the acquired knowledge and skills being remained by constant practice so as to achieve mastery. (2) Tutorial is utilized for designing new concepts and skills (Mayes, 1992). Tutorial in Computer-Assisted

Instructions focuses on the presentation of information and the construction of skills, and guides the learning through information and skills. (3) Problem solving in Computer-Assisted Instructions provides questions or difficult situations for learners to solve the problems through thinking. (4) Simulations in Computer-Assisted Instructions offer learners with a simulated learning environment in order to enhance the logistic thinking. (5) Games in Computer-Assisted Instructions aim to promote learners' logistic thinking through entertaining and challenging games so as to achieve the learning effects.

Logistic Thinking

Logistic Thinking refers to individual applying systematic thinking process and rules to comprehending, explaining, and executing objects or affairs (Roadrangka & Yeany, 1983; Hsu, 2010; Chen & Kuo, 2009). Chen (2009) and Chang (2010) regarded reasoning ability (logical reasoning ability) as deducing a new thinking process for judgment based on one (or several) judgment. Hsiung (2011) considered that Logistic Thinking could provide the acquisition and understanding of scientific concepts. Chiang (2010) studied the classification of 448 junior and senior high school students' logic thinking and found five types of Logistic Thinking, namely Reasonable logistic thinking, Unreasonable logistic thinking, Shock logistic thinking, Gradually reasonable logistic thinking, and Gradually unreasonable logistic thinking.

Roadrangka & Yeany (1983), Lawson (1985), Bitner (1986) concluded six type of Logistic Thinking. 1. Conservation referred to mastering certain characteristics being changed with a changed system. 2. Proportional reasoning referred to the characteristics presenting two corresponding values when the system is under certain condition. Once the condition was changed, the two corresponding values could still be judged so as to maintain the unchanged thinking capability. 3. Controllable factors referred to correctly changing independent variables, when other factors in the system remained unchanged, so as to observe the thinking capability of dependent variables. 4. Probabilistic reasoning referred to the thinking capability to acquire individuals with certain characteristics in a group. 5. Correlation reasoning referred to the thinking capability to judge the interactive relations among variables, i.e., the reasoning capability to establish the relationship among variables. 6. Compositional reasoning referred to appropriately select the elements in a group for a set of composition and further discover the composition state.

Creation Capability

People apply intelligence to creating tools and knowledge for the presently convenient and abundant world that creativity is considered as a unique character for human beings. Everyone possesses such character, like intelligence. Chien (2010) indicated the correlations between intelligence and creativity. Literature on creativity

could be traced back to several centuries. Plato emphasized the demand of talents with creativity in the society that they were cultivated and developed by the country (Cropley, 2001). In consideration of the distinct definitions, Lin (2011) and Chen (2009) analyzed creativity from the aspects of Capability, Personality trait, and Mental processing. Creativity was first regarded as the divergent thinking capability with the characteristics of fluency, flexibility, originality, and elaboration. In terms of Personality trait, Tsai & Kao (2011) proposed creative emotion of personal curiosity, adventure, imagination, and challenge. Wei (2009) and Li (2010) regarded creation as a process, including (1) Preparation, in which instructions were based on original knowledge, rather than out of nothing, (2) Incubation, when a question could be temporarily tabled, but the solutions were still considered subconsciously, (3) Illumination, a key in realizing how to solve a problem, and (4) Verification, to verify the feasibility by applying logistic thinking to analyzing and judging the realized concept. Based on the definitions, this study tends to analyze creativity from the aspects of Capability, Personality trait, and Mental processing.

Relevant Study on Computer-Assisted Instructions, Logistic Thinking, and Creation Capability

Huang (2011) studied Creation Capability of 500 junior high school students and found that Computer-Assisted Instructions were a critical factor in Logistic Thinking that the ones with better Creation Capability presented better performance

on Computer-Assisted Instructions and higher Logistic Thinking. Chang (2010) indicated that students encountered various difficulties in Computer-Assisted Instructions because of the complexity of Logistic Thinking. When students' capability of Logistic Thinking could not match the logic organization, they were likely to present difficulties. Hsiung (2011) indicated that the development of Creation Capability, proposed by Piaget, was an excellent structure to assist students in the development of Logistic Thinking in Computer-Assisted Instructions. With empirical study, Tang (2010) discovered the significant correlations among Computer-Assisted Instructions, Logistic Thinking, and Creation Capability. Apparently, Computer-Assisted Instructions could affect students' Logistic Thinking. However, a lot of research also showed that not all college students would achieve the capability of Logistic Thinking. In this case, appropriate teaching strategies and various Computer-Assisted Instructions should be applied to Computer-Assisted Instructions so that students with distinct Logistic Thinking could present Creation Capability.

Aiming at the above statements, the following hypotheses were proposed in this study.

Hypothesis 1 (H1): Computer-Assisted Instructions appears significantly positive effects on Logistic Thinking.

Hypothesis 2 (H2): Creation Capability presents remarkably positive effects on Computer-Assisted Instructions.

Hypothesis 3 (H3): Creation Capability shows notably positive effects on Logistic Thinking.

Hypothesis 4 (H4): Creation Capability reveals moderating effects on Computer-Assisted Instructions and Logistic Thinking.

Research Methods

Research Framework

According to the literature review, there were correlations among Computer-Assisted Instructions, Logistic Thinking, and Creation Capability. The research framework is proposed as below in Figure 1.

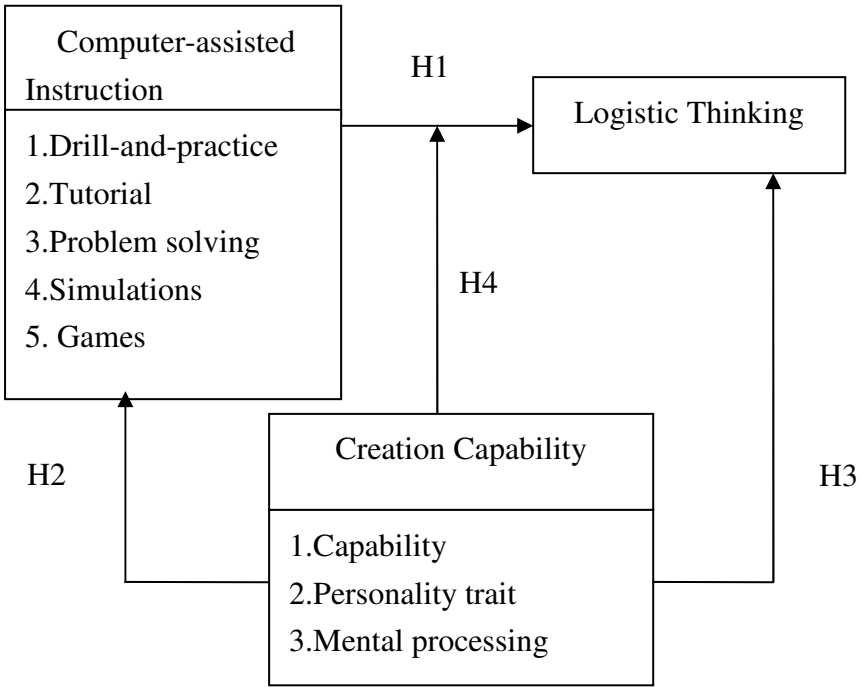

Figure 1. Research Framework

Sampling and Sample Analyses

With random sampling, 88 elementary schools with G1 students using *e-books* were posted and collected questionnaires, where the G1 pupils, their parents, and the school teachers were the research subjects. Within the distributed 880 questionnaires,

513 effective copies were retrieved, with the retrieval rate 58%. Each retrieved copy was regarded as an effective sample.

Research Outcomes and Analyses

Analyses of Reliability and Validity

1. Computer-Assisted Instructions Scale

Questions for Computer-Assisted Instructions were based on the definitions and types proposed by various researchers. With Factory Analysis, five factors were extracted for Computer-Assisted Instructions, including Drill-and-practice (eigenvalue=3.127, α=0.86), Tutorial (eigenvalue=2.472, α=0.83), Problem solving (eigenvalue=2.013, α=0.87), Simulations (eigenvalue=1.394, α=0.85), and Games (eigenvalue=1.116, α=0.90). The common cumulative variance explained achieved 80.284%.

2. Logistic Thinking Scale

The design of Logistic Thinking was referred to Roadrangka & Yeany (1983), Lawson (1985), and Bitner (1986), to which a single dimension was applied.

3. Creation Capability Scale

Creation Capability questionnaire was revised from the ones applied in different research. With Factory Analysis, Creation Capability Scale was extracted the factors of Capability (eigenvalue=2.736, α=0.84), Personality trait (eigenvalue=2.138, α=0.81), and Mental processing (eigenvalue=1.922, α=0.82). The common cumulative variance explained reached 82.053%.

Regression Relations Among Variables

1. Multiple Regression Analysis between Computer-Assisted Instructions and Logistic Thinking.

In regard to Multiple Regression Analysis of Computer-Assisted Instructions towards Logistic Thinking, the dimensions of Drill-and-practice, Tutorial, Problem solving, Simulations, and Games for Computer-Assisted Instructions were regarded as independent variables, while Logistic Thinking was the dependent variable. The analyses were listed in Table 1.

The regression equation achieved significance ($F=8.147$, $p<0.001$), showing the significant correlations between Computer-Assisted Instructions and Logistic Thinking. Drill-and-practice, Tutorial, Problem solving, Simulations, and Games appeared remarkably positive effects on the market share of products with Logistic Thinking, with significant standards ($\beta=0.159$, $p<0.05$; $\beta=0.163$, $p<0.05$; $\beta=0.232$, $p<0.01$; $\beta=0.243$, $p<0.01$; $\beta=0.186$, $p<0.05$). H1 therefore was agreed.

2. Multiple Regression Analysis between Creation Capability and Computer-Assisted Instructions.

In terms of Multiple Regression Analysis of Creation Capability towards Computer-Assisted Instructions, Capability, Personality trait, and Mental processing for Creation Capability were regarded as independent variables, while Drill-and-practice, Tutorial, Problem solving, Simulations, and Games for Computer-Assisted Instructions were dependent variables. The analyses are listed in Table 2.

The regression equation reached significance ($F=11.572$, $p<0.001$), presenting the notably positive effects of Creation Capability on Drill-and-practice. Capability and Personality trait appeared remarkably positive effects on Drill-and-practice ($\beta=0.162$, $p<0.05$; $\beta=0.153$, $p<0.05$). The regression equation reached significance ($F=15.384$, $p<0.001$), presenting the notably positive effects of Creation

Table 1. Multiple Regression Analysis between Computer-Assisted Instructions and Logistic Thinking

Independent variables	Logistic Thinking (Dependent variables)
Computer-Assisted Instructions	
Drill-and-practice	0.159*
Tutorial	0.163*
Problem solving	0.232**
Simulations	0.243**
Games	0.186*
F	8.147
Significance	**0.000*** **
R^2	0.266
Regulated R^2	0.242
*p＜0.05 **p＜0.01 ***p＜0.001	

Data source: Self-sorted in this study

Capability on Tutorial. Both Capability and Personality trait revealed remarkably positive effects on Tutorial (β＝0.173, p＜0.05; β＝0.211, p＜0.01). The regression equation achieved significance (F=18.282, p＜0.001), showing the notably positive effects of Creation Capability on Problem solving. Capability, Personality trait, and Mental processing appeared significantly positive effects on Problem solving (β＝0.217, p＜0.01; β＝0.237, p＜0.01; β＝0.223, p＜0.01). The regression equation reached significance (F=23.174, p＜0.001), presenting the remarkably positive effects of Creation Capability on Simulations. Mental processing revealed notably positive effects on Simulations (β＝0.178, p＜0.05). The regression equation achieved significance (F=26.424, p＜0.001), revealing the remarkably positive effects of

Creation Capability on Games. Personality trait appeared significantly positive effects on Games ($\beta = 0.182$, $p < 0.05$).

The notably positive effects of Creation Capability on Computer-Assisted Instructions showed the partial agreement of H2.

3. Multiple Regression Analysis between Creation Capability and Logistic Thinking

Regarding Multiple Regression Analysis of Creation Capability towards Logistic Thinking, Capability, Personality trait, Mental processing for Creation Capability were regarded as independent variables, and Logistic Thinking as the dependent variable. The analyses are listed in Table 3.

Table 2. Multiple Regression Analysis between Creation Capability and Computer-Assisted Instructions

Independent variables	Computer-Assisted Instructions (Dependent variables)				
	Drill-and-practice	Tutorial	Problem solving	Simulations	Games
Creation Capability					
Capability	0.162*	0.173*	0.217**	0.102	0.125
Personality trait	0.153*	0.211**	0.237**	0.134	0.182*
Mental processing	0.124	0.128	0.223**	0.178*	0.119
F	11.572	15.384	18.282	23.174	26.424
Significance	0.000***	0.000***	0.001***	0.000***	0.000***
R^2	0.217	0.228	0.245	0.325	0.348
Regulated R^2	0.201	0.213	0.231	0.312	0.335
*p < 0.05 **p < 0.01 ***p < 0.001					

Data source: Self-sorted in this study

The regression equation reached significance (F=9.384, $p<0.001$), presenting the notably positive effects of Creation Capability on Logistic Thinking. Capability, Personality trait, and Mental processing revealed remarkably positive effects on Logistic Thinking ($\beta=0.254$, $p<0.001$; $\beta=0.204$, $p<0.01$; $\beta=0.217$, $p<0.01$). H3 therefore was partially agreed.

Effects of Computer-Assisted Instructions and Creation Capability on Logistic Thinking

1. Moderating effects of Computer-Assisted Instructions and Creation Capability on Logistic Thinking

With the interactions between Drill-and-practice, Tutorial, Problem solving, Simulations, Games and Capability, Personality trait, Mental processing, the effects on Logistic Thinking are listed in Table 4.

Table 3. Multiple Regression Analysis between Creation Capability and Logistic Thinking

Independent variables	Logistic Thinking (Dependent variables)
Creation Capability	
Capability	0.254***
Personality trait	0.204**
Mental processing	0.217**
F	9.384
Significance	**0.000*** **
R^2	0.247
Regulated R^2	0.233
*p＜0.05 **p＜0.01 ***p＜0.001	

Data source: Self-sorted in this study

According to the above Regression Analysis, the dimensions for Computer-Assisted Instructions could explain 26.6% variance of the dependent variables for Logistic Thinking before inputting the independent variables for Creation Capability. The overall test of Multiple linear regression F=8.147 ($p<0.001$) reached significance, presenting the notably positive effects of Computer-Assisted Instructions on Logistic Thinking. The standardized regression coefficient β of Drill-and-practice, Tutorial, Problem solving, Simulations, and Games appeared 0.159 ($p<0.05$), 0.163 ($p<0.05$), 0.232 ($p<0.01$), 0.243 ($p<0.01$), and 0.186 ($p<0.05$), respectively, achieving significance. The values of independent variables reached significance and were positive that they revealed notably positive effects on Logistic Thinking.

Table 4. Hierarchical Regression Analysis of Computer-Assisted Instructions and Creation Capability toward Logistic Thinking

Hierarchical variable	Logistic Thinking (Dependent variables)		
	Hierarchy I	Hierarchy II	Hierarchy III
Computer-Assisted Instructions			
Drill-and-practice	0.159*	0.183*	0.201**
Tutorial	0.163*	0.177*	0.195*
Problem solving	0.232**	0.206**	0.184*
Simulations	0.243**	0.169*	0.152*
Games	0.186*	0.192*	0.209**
Creation Capability			
Capability		0.166*	0.169*
Personality trait		0.134	0.154*
Mental processing		0.188*	0.197*
Interactive terms			

Drill-and-practice×Capability			0.102
Tutorial×Capability			-0.113
Problem solving×Capability			0.124
Simulations×Capability			0.086
Games×Capability			-0.025
Drill-and-practice×Personality trait			0.038
Tutorial×Personality trait			-0.112
Problem solving×Personality trait			0.188*
Simulations×Personality trait			0.194*
Games×Personality trait			0.059
Drill-and-practice×Mental processing			0.076
Tutorial×Mental processing			0.033
Problem solving×Mental processing			-0.004
Simulations×Mental processing			0.211**
Games×Mental processing			0.094
F	8.147	16.428	23.351
Significance	0.000***	**0.000*** **	**0.000*** **
R^2	0.266	0.330	0.373
$\triangle R^2$	0.266	0.064	0.043

Data source: Self-sorted in this study

Having input the independent variables for Creation Capability to Regression Model, the total variance explained increased 6.4%, and F=16.428 ($p < 0.001$) reached significance. In general, both Computer-Assisted Instructions and Creation Capability presented notably positive effects on Logistic Thinking, with the increasing variance explained of 33%. Worth mentioning, Drill-and-practice, Tutorial, Problem solving, Simulations, and Games showed significantly positive effects on Logistic Thinking

before inputting Creation Capability. However, the significance of Drill-and-practice, Tutorial, and Games increased remarkably after inputting Creation Capability. Apparently, the moderation of Creation Capability could affect the effects of Computer-Assisted Instructions on Logistic Thinking. After inputting the interactions between Computer-Assisted Instructions and Creation Capability, the total variance explained was also increased, and F=23.351 ($p < 0.001$) achieved significance, presenting the notably positive effects of the five variables on Logistic Thinking. With the interactions between Problem solving and Personality trait, Simulations and Personality trait, and Simulations and Mental processing, they appeared remarkably positive effects on Logistic Thinking ($\beta = 0.188$, $p < 0.05$; $\beta = 0.194$, $p < 0.05$; $\beta = 0.211$, $p < 0.01$). H4 therefore was partially agreed.

Conclusion

The research findings show the remarkably positive effects of Computer-Assisted Instructions on Logistic Thinking that the following suggestions are proposed for the applications of Computer-Assisted Instructions with E-books.

1. Internet on campus. Although Computer-Assisted Instructions with E-books presents great excellence, there are some difficulties, such as the requirements of computer peripherals and Internet being a challenge for promoting Computer-Assisted Instructions with E-books. Schools therefore have to reinforce the equipment of

computer peripherals and wireless network.

2. Training of Computer-Assisted Instructions. Teachers appear different understanding on E-books and software that distinct opinions are shown. Some teachers would make great progress, while others might still struggle for independent operations. In this case, students would not evenly benefit from Logistic Thinking and Creation Capability. Computer-Assisted Instructions trainings for teachers should be enhanced.

3. Ubiquitous learning. Computer-Assisted Instructions with E-books allows the lessons being diverse. For instance, the instructions of teachers asking questions and students answering are not necessarily practiced in classes. Recording and asking questions at any time allow information share between teachers and students and could reinforce their Logistic Thinking and Creation Capability.

4. Recording software. The recording software could be applied to daily learning, as students could record the lessons in classes and listen to them afterwards. Such a method could promote the learning effects of Logistic Thinking and Creation Capability.

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International Journal of Organizational Innovation

PREDICTING PATIENTS AT RISK OF ACUTE RENAL FAILURE IN INTENSIVE CARE UNITS BY USING ARTIFICIAL INTELLIGENCE TOOLS

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Abstract

According to the report by the Taiwan National Kidney Foundation, approximately 42,000 end-stage renal disease patients were diagnosed up to 2010. In intensive care units (ICUs), acute renal failure complicating nonrenal organ system failure in the ICU setting is associated with mortality rates of 50% to 70%. This study collected data of 293 patients in ICUs. We used 3 popular data mining algorithms (artificial neural networks, decision tree C5.0, and logistic regression) to predict the death and dialysis of patients. The results indicate that decision tree C5.0 outperformed artificial neural network and logistic regression. In predicting patient death, the decision tree C5.0 achieved a classification accuracy of 0.925, with a sensitivity of 0.961 and a specificity of 0.889. In predicting patient dialysis, the decision tree C5.0 achieved a classification accuracy of 0.936, with a sensitivity of 0.972 and a specificity of 0.919. The result suggested that decision tree C5.0 may derive an optimal prognosis model in practice.

Keywords: k-Fold cross-validation; Artificial Neural Network; Decision tree C5.0; Logistic Regression

Introduction

According to the statistics of the National Kidney Foundation in Taiwan, approximately 42,000 end-stage renal disease (ESRD) patients were diagnosed in Taiwan up to 2010. Kidney disease is one of the 10 leading causes of the death in Taiwan (Department of Health, 2011) (Table 1). Currently, hemodialysis is a cause of concern in Taiwan, and is the most frequently diagnosed disease in Taiwan at a rate of nearly 4 in 100 diseases diagnosed. Therefore, compatriots focus considerably on kidney disease. Acute renal failure (ARF) in the intensive care unit (ICU) is associated with 45% to 70% mortality. The purpose of this study was to construct a prognosis model for dialysis induced in surgical ICUs; the results of this study can provide the prognosis model for clinical treatment (Ravindra, et al., 2002). This study emphasized hemodialysis-related research, and novel and innovative methods for early detection and treatment were developed, which helped reduce the hemodialysis-related death rate.

Table 1. The kidney diseases is one of ten major causes of the death in Taiwan

Kidney Trouble										
Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Rank	7	8	7	7	8	7	8	10	10	10

Data authority: Department of Health, Executive Yuan, Taiwan. (2011)

Conversely, use of data mining in medicine is a rapidly growing field that aims to discover structure in large clinical heterogeneous data (Cios & Moore, 2002).

Experts are limited and may overlook crucial details, whereas automated discovery tools can analyze the raw data and extract high level information for decision makers (McDonald, Brossette, & Moser, 1998). Artificial neural networks (ANNs) are one of the most successful data mining techniques, which denotes a set of connectionist models inspired by the behavior of the human brain, and presents useful capabilities for medicine, such as nonlinear learning, multidimensional mapping, and noise tolerance (Evans, et al., 1997). In the past, several studies compared ANNs and logistic regression models for ICU mortality prediction, and reported either superior (Nimgaonkar & Sudarshan, 2004; Dybowski, Weller, Chang, & Gant, 1996) or similar (Clermount et al., 2001; Wong, & Young, 1999; Doig et al., 1993) performances.

In addition, Chae et al. (2001) explained that some of the previous applications for data mining in health care were pathology information systems (Hand, Mannila, & Smyth, 2001; Haykin, 1999). However, these systems did not explicitly manage policy analysis using various data-mining models. Long et al. (1993) compared the performance of logistic regression to a popular data mining model, called C4.5 decision tree induction, in classifying patients with acute cardiac ischemia, and found that logistic regression exhibited superior performance to C4.5. Chae et al. (2001) compared the performance of logistic regression and 2 decision tree algorithms,

CHIAD (Chi-squared Automatic Interaction Detection) and C5.0 (a variant of C4.5), in predicting hypertension. The results of such studies may indicate the CHIAD algorithm exhibited superior performance to logistic regression in predicting hypertension; and C5.0 had the lowest predictive power.

In this study, we used data contained in the diseases databases from a medical center located in northern Taiwan for the years 1995-2010, which is the most comprehensive source of information on hemodialysis incidence in Taiwan. We used 3 distinct types of classification models, as follows: ANN, decision tree C5.0, and logistic regression along with a 10-fold cross-validation technique to compare the accuracy of these classification models. In addition, this paper demonstrates the possible use of decision tree C5.0 and another data mining model in a policy analysis for hemodialysis management in a health-insurance domain.

The remainder of this paper is organized as follows: the ICU clinical data are presented and the prognostic models are introduced in Section 2; a description of the performed experiments, and analysis and discussion of the results is provided in Sections 3 and 4; and finally, conclusions are offered in Section 5.

Methods

Artificial neural networks

Artificial neural networks are commonly known as biologically inspired and highly sophisticated analytical techniques that are capable of modeling extremely complex nonlinear functions. The extraction of knowledge from ANNs remains an active research area (Setiono, 2003). Currently, 2 main approaches are used (Tickle et al., 1998), as follows: decompositional and pedagogical techniques.

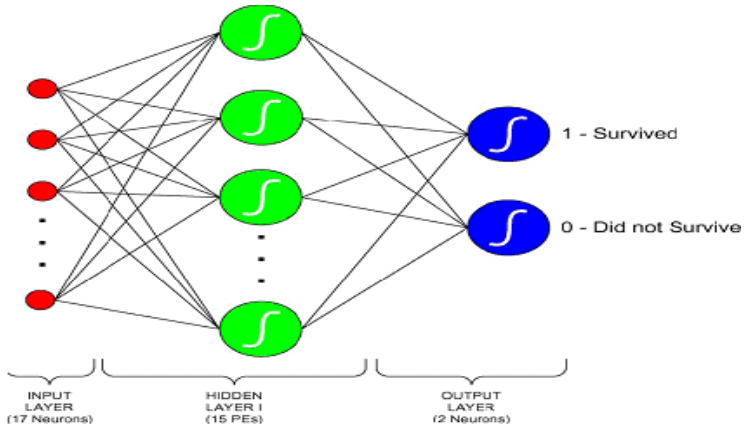

Figure 1 Graphical representation of our MLP ANN model
Delen et al, 2005).

Formally defined, ANNs are analytic techniques modeled on the processes of learning in the cognitive system and the neurological functions of the brain, and are capable of predicting new observations from other observations after executing a process of so-called learning from existing data (Haykin, 1998). Delen, Walker, and Kadam (2005) used a popular ANN architecture called multilayer perceptron (MLP) with backpropagation (a supervised learning algorithm). The MLP is a powerful function approximator for prediction and classification problems. Hornik et al. (1990)

empirically demonstrated that, with the appropriate size and the structure, MLP can arbitrarily learn complex nonlinear functions to arbitrary accuracy levels. Fig. 1 shows the graphical representation of the MLP architecture (Delen, Walker, & Kadam, 2005).

Decision tree

Decision trees are effective classifiers in a variety of domains, and it assumes that the effect of a variable in the subset is unrelated to the effect of the variable in other subsets of subjects. Decision trees are powerful classification algorithms that are increasingly popular with the growth of data mining in the field of information systems. Popular decision tree algorithms include Quinlan's ID3, C4.5, C5.0 (Quinlan, 1993, 1986), and CART by Breiman et al. (1984). C5.0 uses a pruning strategy in which a branch is pruned when the introduced error is one standard error of the existing errors adjusted for continuity correction. C5.0 also uses a boosting technique to generate and combine multiple classifiers to provide improved predictive accuracy. Compared with C4.5, the error rate of boosted classifiers of C5.0 is approximately one-third of the error rate of single classifiers of C4.5 (Biggs, Ville, & Suen, 1991). In this study, the decision tree categorized all patients according to whether they were likely to have hemodialysis. CHIAD and C5.0 are 2 popular decision-tree inducers, based on the ID3 classification algorithm by Quinlan (1993).

Logistic Regression

Logistic regression is a generalization of linear regression (Hastie, Tibshirani, & Friedman, 2001). It is a nonlinear regression method for predicting a dichotomous dependent variable. Therefore, rather than predicting point estimate of the event, logistic regression builds the model to predict the odds of its occurrence. In a two-class problem, odds greater than 50% indicate that the case is assigned to the class designated as ‘‘1’’; otherwise, it is ‘‘0’’. Although logistic regression is a powerful modeling tool, it assumes that the response variable is linear in the coefficients of the predictor variables. Logistic regression was performed to identify risk factors for hemodialysis using patient characteristics, history, lifestyle, test results as independent variables, and hemodialysis status as the dependent variable. Stepwise selections of the independent variables were performed, and the corresponding coefficients were computed. In producing the logistic regression equation, the maximum-likelihood ratio was used to determine the statistical significance of the variables.

Measures for performance evaluation

Accuracy, sensitivity and specificity

In this study, we used three performance measures, as follows: accuracy (1), sensitivity (2), and specificity (3) (Delen, Walker, & Kadam, 2005):

$$accuracy = \frac{TP + TN}{TP + TN + FP + FN} \quad \text{Eq. 1}$$

$$sensitivity = \frac{TP}{TP + FN} \quad \text{Eq. 2}$$

$$specificity = \frac{TN}{TN + FP} \quad \text{Eq. 3}$$

where TP denotes true positives, TN denotes true negatives, FP denotes false positives, and FN denotes false negatives.

k-Fold cross-validation

Delen, Walker, & Kadam (2005) indicated that researchers tend to use kfold cross-validation to minimize the bias associated with the random sampling of the training and holdout data samples in comparing the predictive accuracy of 2 or more methods. In k-fold cross-validation, also called rotation estimation, the complete data set (D) is randomly split into k mutually exclusive subsets (the folds: D1, D2, . . ., Dk) of approximately equal size. Empirical studies indicated that stratified cross-validation tends to generate comparison results with lower bias and lower variance when compared to regular k-fold cross-validation (Kohavi, 1995). Furthermore, a stratified 10-fold cross-validation approach was used to estimate the performance of classifiers. Empirical studies indicate that 10 may be an optimal number of folds (Kohavi, 1995; Breiman et al., 1984).

In 10-fold cross-validation, the entire data set was divided into 10 mutually exclusive subsets with approximately the same class distribution as the original dataset. Each fold was used once to test the performance of the classifier that was generated from the combined data of the remaining 9 folds, leading to 10 independent performance estimates (Fig. 2).

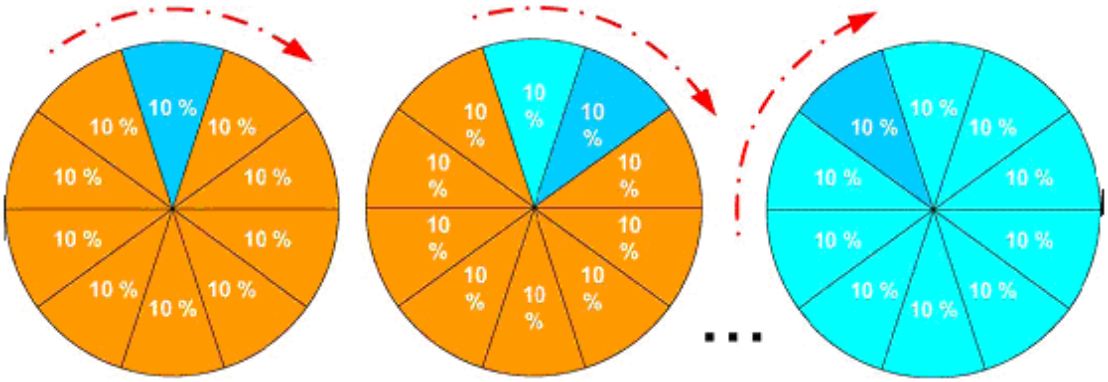

Figure 2 Graphical depiction of the ten-fold cross-validation procedure. (Delen et al., 2005).

Approach

Data Analysis

We used the data contained in the diseases databases of a medical center to perform the research. We distributed 572 data and collected 293 data. Sixty-two variables were included in the data, such as death, dialysis, sex, age, BH, BW, and BSA, which were collected during the physical examination, and each record in the data relates to a specific incidence of condition. The data understanding and the data preparation stages are among the most crucial steps in the data mining applications. A considerable amount of time is spent on developing data mining applications in these early stages (Cios, & Moore, 2002). The raw data were uploaded into an Excel database, SPSS statistical analysis tool, Statistical data miner, and Clementine data mining toolkit. These software packages were used to explore and manipulate the

data. The following section describes the surface complexities and structure of the data.

Data Processing

We used ANNs, decision tree C5.0, and logistic regression to train 3 real-world data sets.

Experimental Results and Discussion

All experimental results in this study were obtained from an AMD Turion64*2 MK38 2 GHz PC on a Windows XP professional operating system. We performed experiments by using the published template data sets, and compared the results of decision tree C5.0, ANN, and logistic regression. Because we did not determine the appropriate parameter or kernels for the samples, several parameters and randomly selected kernels of decision tree C5.0, ANN, and logistic regression were assessed to determine the optimal performance of prediction. The comparison was based on 10-fold cross-validation. The experimental results are listed by accuracy, sensitivity, and specificity, as shown in Tables 2 and 3.

In this study, the models were evaluated based on the classification of accuracy measures, as follows: (1) accuracy, (2) sensitivity, and (3) specificity. The results were achieved using 10-fold cross-validation for each model, and were based on the average results obtained from the test data set (the 10th fold) for each fold.

Table 2 shows the accuracy, sensitivity, and specificity comparison of decision tree C5.0, logistic regression, and ANN. For the death dataset, the decision tree C5.0 achieved a classification accuracy of 0.925, with a sensitivity of 0.961 and a specificity of 0.889. The logistic regression model achieved a classification accuracy of 0.733, with a sensitivity of 0.741 and a specificity of 0.701. The ANN model achieved a classification accuracy of 0.892, with a sensitivity of 0.926 and a specificity of 0.889. The decision tree C5.0 outperformed ANN and logistic regression.

Table 3 shows the accuracy, sensitivity, and specificity comparison of decision tree C5.0, logistic regression, and ANN. For the dialysis data set, the decision tree C5.0 achieved a classification accuracy of 0.963, with a sensitivity of 0.972 and a specificity of 0.919. The logistic regression model achieved a classification accuracy of 0.730, with a sensitivity of 0.754 and a specificity of 0.708. The ANN model achieved a classification accuracy of 0.911, with a sensitivity of 0.933 and a specificity of 0.921. The decision tree C5.0 outperformed ANN and logistic regression.

Table 2 Results of predicted the patients' death for 10-fold cross-validation for all folds and all model type

Fold No.	Decision Tree C5.0			Logistic Regression			ANN		
	Accuracy	Sensitivity	Specificity	Accuracy	Sensitivity	Specificity	Accuracy	Sensitivity	Specificity
1	0.924	0.947	0.915	0.731	0.749	0.681	0.877	0.916	0.877
2	0.921	0.961	0.874	0.736	0.720	0.714	0.916	0.945	0.911
3	0.926	0.968	0.886	0.713	0.718	0.706	0.890	0.891	0.875
4	0.929	0.958	0.875	0.746	0.773	0.705	0.883	0.932	0.862
5	0.929	0.959	0.911	0.730	0.718	0.723	0.877	0.953	0.861
6	0.930	0.960	0.890	0.736	0.740	0.674	0.910	0.924	0.896
7	0.920	0.951	0.919	0.706	0.753	0.710	0.862	0.910	0.905
8	0.924	0.966	0.881	0.748	0.775	0.678	0.919	0.895	0.857
9	0.929	0.968	0.865	0.727	0.725	0.726	0.864	0.950	0.914
10	0.921	0.971	0.874	0.753	0.744	0.694	0.921	0.950	0.861
Mean	0.925	0.961	0.889	0.733	0.741	0.701	0.892	0.926	0.882
St. Dev.	0.004	0.008	0.019	0.015	0.021	0.019	0.023	0.023	0.023

Table 3 Results of predicted the patients' dialysis for 10-fold cross-validation for all folds and all model type

Fold No.	Decision Tree C5.0			Logistic Regression			ANN		
	Accuracy	Sensitivity	Specificity	Accuracy	Sensitivity	Specificity	Accuracy	Sensitivity	Specificity
1	0.957	0.980	0.904	0.715	0.737	0.692	0.934	0.946	0.926
2	0.952	0.977	0.932	0.745	0.761	0.723	0.935	0.934	0.922
3	0.961	0.970	0.918	0.748	0.761	0.737	0.912	0.942	0.926
4	0.967	0.979	0.925	0.743	0.775	0.690	0.905	0.926	0.911
5	0.899	0.965	0.921	0.719	0.751	0.707	0.930	0.923	0.920
6	0.892	0.966	0.922	0.706	0.780	0.688	0.895	0.942	0.905
7	0.943	0.979	0.929	0.741	0.752	0.706	0.902	0.928	0.937
8	0.933	0.972	0.921	0.744	0.756	0.724	0.891	0.926	0.931
9	0.963	0.971	0.904	0.701	0.736	0.687	0.901	0.933	0.923
10	0.898	0.960	0.914	0.734	0.731	0.729	0.902	0.925	0.912
Mean	0.936	0.972	0.919	0.730	0.754	0.708	0.911	0.933	0.921
St. Dev.	0.029	0.007	0.009	0.018	0.016	0.019	0.017	0.008	0.010

Conclusions

Based on previous studies, the issue of predicting death and dialysis of patients attracted the attention of numerous researchers. Recently, several studies demonstrated that machine learning techniques achieved superior performance than traditional statistical techniques. This study applied decision tree C5.0, ANN, and logistic regression to solve the hemodialysis mortality problem, to achieve optimal performance in predicting hemodialysis mortality. In addition, when compared to the results by ANN and logistic regression, the accuracy of decision tree C5.0 outperformed ANN and logistic regression. Decision tree C5.0 is easy to apply and does not require statistical knowledge. Therefore, decision tree C5.0 is suitable for destination workers who lack professional statistical knowledge. While classification approaches can help physicians diagnose acute renal failure, this study with learning association rules show that can develop risk assessment expert systems. In the fight against acute renal failure, we believe that the combination of association rules and classification approaches will provide an effective means for the accurate and economical diagnosis of acute renal failure. In addition, a more recently developed machine learning technique, a support vector machine (SVM), has been applied to problems in an attempt to provide a model with better explanatory power. In the future, work in this area may focus on the use of SVM for learning decision trees using existing data on acute renal failure.

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THE RELATIONSHIP OF FULL-SERVICE RESTAURANT ATTRIBUTES, EVALUATIVE FACTORS AND BEHAVIORAL INTENTION

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Abstract

The study discusses the relationships between restaurant attributes (i.e. servicescape, waiting experience, and food quality) and evaluative factors (i.e. perceived overall service quality and perceived value) in their predictions of future repurchase behavior intentions. Structural Equation Modeling (SEM) can holistically explain causal relationships among latent variables in a specific domain problem. The analytical results support all the hypotheses. Full-service restaurant operators want to obtain favorable behavioral intentions by providing better servicescape, waiting experience and food quality, thus increasing customer perceptions of overall service quality and value.

Key Words: restaurant attributes, servicescape, waiting experience, customer behavioral intention, Structural Equation Model

Introduction

Various restaurant segments have developed, making the business increasingly competitive. Researchers and restaurateurs have attempted to investigate and understand the importance of restaurant attributes for consumer restaurant selection. Berry, Carbone, and

Haeckel (2002) discussed three categories of indicators of present service experience: functional clues, mechanical clues, and human clues. Full-service restaurants provide waited table service (Spears & Gregoire, 2006). Guests are greeted and seated by a host and orders are taken and delivered by waitstaff. Based on Berry et al. (2002), this study proposes that three key full-service restaurant attributes (i.e. food quality, servicescape, and waiting experience).

Perceived value provides a more comprehensive approach than a simple focus on service quality or satisfaction (Ryu, Han, & Kim, 2008). Despite the growing importance of various types of restaurants in the hospitality industry, behavioral intention having been studied extensively, little empirical evidence is available that links restaurant attributes (i.e. servicescape, waiting experience, and food quality) to such notable service constructs as perceived value, service quality, and behavioral intentions. Improving understanding of restaurant attributes requires a more holistic view of how restaurant attributes lead to certain consumer behaviors through an exploratory empirical investigation of several key hypotheses. Fully benefiting from this knowledge requires service managers to understand more than the bivariate relationships between these variables. The result can also provide clues or clearly indicate that decision makers are the aspects of customer comeback receiving the most attention and investment.

Literature Review

Servicescape consists of three dimensions, including 1) ambient conditions, 2) spatial layout and functionality, and 3) signs, symbols and artifacts (Bitner, 1992). Employees are the main contact between restaurants and their customers, and cognitive responses and repurchase intentions (Tombs & McColl-Kennedy, 2003). Therefore, servicescape comprises interior design, ambient factor, spatial layout and human elements in this study. Physical environment influenced customer evaluations of service quality and behavioral responses (Jang & Namkung,

2009; Kim & Moon, 2009). Customers with positive experience of restaurant servicescape are likely to evaluate service quality of a full-service restaurant positively.

The waiting psychological is very important, as is the associated experience (Fitzsimmons & Fitzsimmons, 2004; Nie, 2000). Therefore, waiting negatively affects consumer perceptions of quality, service evaluation, purchase intention and satisfaction (Berry et al., 2002; Cameron, Baker, Peterson, & Braunsberger, 2003). Some practitioners also try to fill wait time or to influence perceived wait by providing entertainment facilities such as magazines, video games, and electric massage chairs entertain customers (Jen, Tu, & Lu, 2011). On the other hand, waiting time is known as a "time price" (Baker, Parasuraman, Grewal, & Voss, 2002), and is a non-monetary price component associated with service acquisition (Zeithaml, 1988). Positive waiting experience does not create negative perceptions, but rather positively affects customer perceptions of overall service quality or value.

Consumers derive their perceptions of food quality from tastiness of food, menu variety, variety of food, food presentation, serving size, safety, appeal, dietary acceptability, healthy options, food freshness, temperature and cleanliness (Kim, Ng, & Kim, 2009; Kivela, Inbakaran, & Reece, 2000; Liu & Jang, 2009; Namkung & Jang, 2007; Qin & Prybutok, 2008; Raajpoot, 2002; Sulek & Hensley, 2004). Food quality is a significant determinant of customer assessments of restaurants (Susskind & Chan, 2000), and is essential to satisfy consumer needs and expectations (Peri, 2006).

Behavioral intention describes an affirmed likelihood of engaging in a certain behavior (Oliver, 1997). Service quality describes subjective customer evaluation. Ha and Jang (2010) adopted DINESERV and modified service quality items to measure overall service quality. Restaurant service quality directly and significantly influences perceived value (Cronin, Bready,

& Hult, 2000), and customer behavioral intentions (Liu & Jang, 2009). Perceived quality is a mediator (Giebelhausen, Robinson, & Cronin, 2010). The relationship between restaurant attributes and customer behavioral intention, perceived overall service quality and customer behavioral intention might be mediated by perceived value and perceived overall service quality. Thus, the following hypotheses were proposed:

Hypothesis 1. Servicescape positively influences perceived overall service quality.

Hypothesis 2. Waiting experience positively influences perceived overall service quality.

Hypothesis 3. Waiting experience positively influences perceived value.

Hypothesis 4. Food quality positively influences perceived value.

Hypothesis 5. Perceived overall service quality positively influences perceived value.

Hypothesis 6. Perceived overall service quality positively influences customer behavioral intention.

Hypothesis 7. Perceived value positively influences customer behavioral intention.

Hypothesis 8. Perceived overall service quality plays a mediating role in the relationship between restaurant attributes and customer behavioral intention.

Hypothesis 9. Perceived value plays a mediating role in the relationship between restaurant attributes and customer behavioral intention, perceived overall service quality and customer behavioral intention.

Methodology

Table 1 lists the constructs, definitions and sources of scales. The questionnaire was first developed in English, but the survey was conducted in Chinese. Experts on industrial practice and bilingual professors familiar with the subject content were invited to help with the translation. The draft questionnaire was developed and used respondent anonymity, meaning

anonymity of the measurement items, to reduce evaluation apprehension and was pilot-tested by 50 full-service restaurant diners. The result of the pilot-test is that the reliability of all variables' the standard value of 0.7 suggested by Hair, Anderson, Tatham, and Black (1998). Items that do not significantly contribute to the reliability and have lower reliability are eliminated. All items were assessed using a 7-point Likert-scale, ranging from extremely disagree (1) to extremely agree (7).

Table 1. Construct Measurement

Construct	Construct Definition	Construct Sources
Servicescape	The physical settings and environment of full-service restaurant comprises interior design, ambient factor, spatial layout and human elements.	Bitner (1992) Ryu and Han (2011)
Waiting experience	The degree to which customers are satisfied with the waiting time associated with a desired service.	Sulek and Hensley (2004)
Food quality	The restaurant provides in terms of food tasty, food presentation, menu variety and healthy food options.	Namkung and Jang (2007)
Perceived overall service quality	The restaurant provides food exactly, prompt and quick service, and well response employee.	Ha and Jang (2010)
Perceived value	Overall consumer assessment of consumption experiences is based on perceptions of what is received versus what is provided.	Ryu, Han, & Kim (2008)
Customer behavioral intention	The intention of a customer returns to a full-service restaurant, recommend it to others, and provide positive word of mouth.	Zeithaml et al. (1996)

Selected respondents were interviewed face-to-face when they sat at the table by trained interviewers, and a convenience sampling approach was used. Consequently, a total of 396 restaurant diners completed the self-administered questionnaire in Taiwan local full-service restaurants. This study adopts Harman's single-factor to test Common Method Variance (CMV) (Andersson & Bateman, 1997; Aulakh & Gencturk, 2000). It shows that all factors are extracted with the first factor accounting for 0.16472 of the total variance and is lower than 0.50 (Peng, Kao, & Lin, 2006). Clearly among the relationships of constructs are not largely accounted for by the systematic variance associated with the measurement technique.

Result And Analyses

The instrument's reliability was assessed by squared multiple correlations (SMC), Cronbach's alpha, and composite reliability (CR) as shown in Table 2. The results showed that all the SMC of the measured variables were exceeded 0.50. Cronbach's alphas for all nine constructs exceeded the minimum requirement of 0.7 to ensure adequate internal consistency (Nunnally, 1978). Composite reliabilities for all nine constructs were also above the cutoff value of 0.70, ranging from 0.92 to 0.96. All showed that the instruments were reliable to measure the latent constructs in this study. Secondly, computing correlation coefficients examines the distribution degree and relationship of the data respectively. The correlation matrix is shown in Table 3. The correlation coefficients were ranged from 0.27 to 0.69, which exist in all correlation coefficients significant at $p<0.01$ situation. All constructs were found to have a significant correlation with customer behavioral intention. Since no correlation coefficient was exceeded 0.80, it shows that the multi-collinear does not exist (Billings & Wroten, 1978).

Table 2. Confirmatory factor analysis for the measurement model

Measurement variable	SFL[1]	t-value	SMC[1]	α [1]	CR[1]	AVE[1]
[1] Servicescape						
Interior design				0.95	0.95	0.82
A1: Overall interior design	0.90*[2]	17.17	0.81			
A2: Furnishing style	0.91*	17.28	0.83			
A3: Painting style	0.90*	17.14	0.81			
A4: Table setting style	0.91*	17.36	0.83			
Ambient factor				0.94	0.95	0.81
A5: Scent	0.90*	16.86	0.80			
A6: Room temperature	0.89*	16.56	0.78			
A7: Lighting	0.93*	17.21	0.87			
A8: Music	0.89*	16.60	0.79			
Spatial layout				0.93	0.93	0.82
A9: Comfortable seat space	0.92*	16.83	0.84			
A10: Easy to move around	0.90*	16.30	0.80			
A11: Dining privacy	0.90*	16.45	0.81			
Human elements				0.92	0.92	0.79
A12: Well-dressed employees	0.89*	14.62	0.79			
A13: Professional employees	0.90*	14.88	0.82			
A14: Adequate employees	0.88*	14.50	0.77			
[2] Waiting experiences				0.96	0.96	0.83
WE1: Waiting time before you were seat	0.91*	23.51	0.83			

WE2: Fairness of the order of seating	0.90*	22.89	0.81			
WE3: Comfortable waiting area	0.91*	23.20	0.82			
WE4: Crowding in the waiting area	0.91*	23.57	0.83			
WE5: Politeness of host area staff	0.92*	23.67	0.84			
[3] Food quality				0.96	0.96	0.84
FQ1: Food tasty	0.92*	23.81	0.85			
FQ2: Food presentation	0.92*	23.67	0.84			
FQ3: Menu varity	0.92*	23.74	0.84			
FQ4: Food healthy options	0.92*	23.73	0.84			
[4] Perceived overall service quality				0.93	0.93	0.82
PE1: Serving food exactly	0.88*	21.93	0.78			
PE2: Providing prompt and quick service	0.90*	22.78	0.82			
PE3: Well response employee	0.92*	23.51	0.85			
[5] Perceived value				0.95	0.95	0.84
PV1: Good service for price	0.90*	22.82	0.81			
PV2: Appropriate price	0.92*	23.72	0.84			
PV3: Meeting specific needs	0.92*	23.89	0.85			
PV4: Good value for money	0.92*	23.77	0.85			
[6] Customer behavioral intention				0.94	0.94	0.84
BI1: Repeat purchase	0.91*	23.12	0.82			
BI2: Recommendation	0.94*	24.40	0.88			
BI3: Saying positive word of mouth	0.91*	23.02	0.82			

Note 1: SFL, standardized factor loading; SMC, squared multiple correlation; α, Cronbach's α; CR, composite reliability; AVE, average variance extracted.

Note 2: *: $p < 0.01$.

In this study, all items had relatively large standardized factor loadings on their underlying constructs (values were ranged from 0.88 to 0.94), and were all significant at an alpha level of 0.01 as shown in Table 3. Furthermore, the average variance extracted (AVE) which were analyzed from all constructs exceeded the minimum criterion of 0.50, ranging from 0.79 to 0.84. The result indicated that the majority of variance was explained by the constructs (Fornell & Larcker, 1981; Hair et al., 1998). Discriminate validity was assessed using the approach

Table 3. Comparison of the squared root of AVE and correlations of paired constructs

Dimension	Correlation coefficient								
	A	B	C	D	E	F	G	H	I
A. Interior design	0.91[1]								
B. Ambience	0.56*[2]	0.90							
C. Spatial layout	0.59*	0.58*	0.91						
D. Human elements	0.59*	0.61*	0.57*	0.89					
E. Waiting experiences	0.30*	0.30*	0.35*	0.35*	0.91				
F. Food quality	0.27*	0.28*	0.28*	0.32*	0.44*	0.92			
G. Perceived overall service quality	0.49*	0.47*	0.40*	0.47*	0.55*	0.42*	0.90		
H. Perceived value	0.41*	0.39*	0.38*	0.39*	0.57*	0.69*	0.60*	0.91	

I. Customer behavioral intention	0.32*	0.29*	0.30*	0.27*	0.37*	0.42*	0.45*	0.49*	0.92

Note 1: The squared root of AVE is on the diagonal. Correlations of paired constructs are on the off-diagonal.
Note 2: *: Correlation coefficients significant at $p < 0.01$.

suggested by Fornell and Larcker (1981). Discriminate validity was to examine the AVE for each of the latent constructs and compared with the squared correlations among the constructs to reveal that the shared variance among any two constructs was less than the average variance explained by the construct. Table 3 lists the result showed all measures to present construct validity. Based on all of the reliability and validity analysis, the construct scales were exhibited satisfactory and adequate.

This study adopted Structural Equation Modeling (SEM). SEM analysis using AMOS 6.0 was performed to test the hypothesized model. The results of SEM were depicted in Table 4 and Figure 1. As shown in most goodness of fit indices, including GFI, AGFI, NFI, CFI and NNFI, ranged from 0.93 to 0.99 for the models, and were well above the recommended level of 0.9 (Byrne, 2001) and SRMR = 0.03 < 0.05 and RMSEA = 0.03 < 0.08. These indicated that hypothesized model is relatively good approximations of the underlying population and is considered satisfactory. Table 4 also represented the path coefficients and each construct's critical ratio (C.R.; t-value). The result indicated that servicescape significantly influenced (β = 0.47, t = 8.77) perceived overall service quality. Waiting experience to perceived overall service quality was 0.38, and to perceived value was 0.19. Waiting experience directly affected on both perceived overall service quality and perceived value in full-service restaurants, with perceived overall service quality showing a stronger effect than perceived value. Food quality had direct effects on perceived value (β = 0.51, t = 12.50). Hypothesis 1, 2, 3, and 4 are supported. Food quality affects customer behavioral intention more than other attributes.

Hypotheses 5 and 6 are supported. However the magnitude of direct effect is different between perceived value and customer behavioral intention, A larger β value for the causal path

from perceived overall service quality to perceived value (β = 0.32, t = 7.24) than for the path from perceived overall service quality to customer behavioral intention (β = 0.24, t = 3.28)

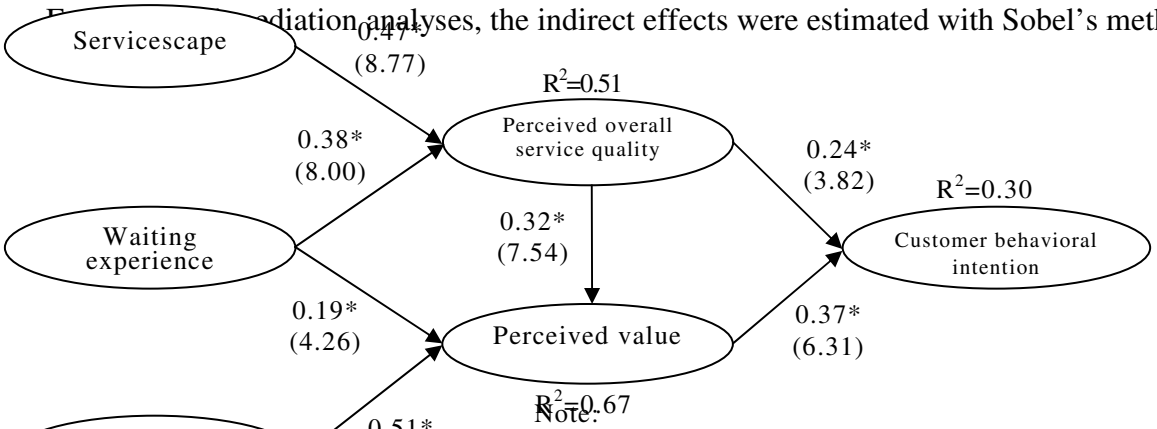
Table 4. Structural parameter estimates

Hypothesized path	Standardized path	t-Value	Results
H1: Servicescape → Perceived overall service quality	0.47***	8.77	Supported
H2: Waiting experience → Perceived overall service quality	0.38***	8.00	Supported
H3: Waiting experience → Perceived value	0.19***	4.26	Supported
H4: Food quality → Perceived value	0.51***	12.50	Supported
H5: Perceived overall service quality → Perceived value	0.32***	7.24	Supported
H6: perceived overall service quality → Customer behavioral intention	0.24***	3.82	Supported
H7: Perceived value → Customer behavioral intention	0.37***	6.08	Supported

$\chi^2_{(396)}$ =280.33 (p=0.00), χ^2 / *df* =1.27, GFI = 0.94, AGFI = 0.93, NFI = 0.97, CFI = 0.99, NNFI = 0.99, SRMR = 0.03, RMSEA = 0.03

Note ***: p < 0.001

For mediation analyses, the indirect effects were estimated with Sobel's method using the SPS



Note:
1. the value within the parentheses ( ) is t-value, * denotes p<0.001.
2. χ^2 =280.33 (p=0.00), χ^2 / *df* =1.27, GFI = 0.94, AGFI = 0.93, NFI = 0.97, CFI = 0.99, NNFI = 0.99, SRMR = 0.03, RMSEA = 0.03

Figure 1. Structural diagram with parameter estimates

indicates that perceived overall service quality are more influential on perceived value than on customer behavioral intention. Hypothesis 7, which linked perceived value with customer behavioral intention, was also supported. Based on the parameter estimate, perceived value showed a strong impact on customer behavioral intention (β = 0.37, t = 6.08). Perceived value is

more important predictor of customer behavioral intention than perceived overall service quality. The SPSS-macro provides an estimate of the true indirect effect and its bias-corrected 95% confidence interval (Sobel test scores, Z values and probability values are given in Table 5). The Sobel test (Table 5) revealed that both perceived overall service quality and perceived value had significantly mediated effects between restaurant attributes (i.e. servicescape, waiting experiences, and food quality) and customer behavioral intention. Thus, Hypotheses 8 and 9 are both supported.

Discussion, Conclusions and Limitations

This study focusing on full-service restaurant considers servicescape to include four dimensions, interior design, ambient factor, spatial layout and Human elements. This study demonstrates that overall service quality depends on the attractiveness of servicescape. Positive waiting experience influences perceived overall service quality and value. Food quality influences perceived value. Food quality is the main predictor of customer behavioral intention among restaurant attributes. This may be because eating not merely satisfies hunger but also

Table 5. Indirect effects of constructs on behavioral intentions through perceived overall service quality and perceived value (Sobel's test results)

Indirect effect	Value	se	LL	UL	Z	Sig.(two)
Perceived overall service quality as mediator						
Servicescape → Customer behavioral intention	0.2533	0.0423	0.1704	0.3362	5.9862	0.0000
Waiting experience → Customer behavioral intention	0.2010	0.0341	0.1342	0.2679	5.8916	0.0000
Perceived value as mediator						
Servicescape → Customer behavioral intention	0.2526	0.0380	0.1781	0.3271	6.6462	0.0000
Waiting experience → Customer behavioral intention	0.2505	0.0364	0.1792	0.3218	6.8870	0.0000
Food quality → Customer behavioral intention	0.2654	0.0429	0.1814	0.3495	6.1892	0.0000
Perceived overall service quality→ Customer behavioral intention	0.2241	0.0374	0.1509	0.2973	5.9979	0.0000

influences value perceptions of consumers. This implies that the actual food offered is comparable to that of many other restaurants, high food quality is the highest priority input, so it represents the essential value perceptions of consumers. Servicescape and waiting experience positively affect perceptions of overall service quality, and customer behavioral intention. Restaurateurs could consider uniqueness and differentiation in store atmosphere, hardware facility, design, and human interaction environment to outperform regional competitors characterized by homogeneous features. For example, resources can be better spent on staff training to enhance staff knowledge, or to construct a pleasant ambience so that customers do not perceive discontinuity and their perceptions of wait time are reduced. On the other hand, it may be more important for restaurateurs to embed the waiting experience into total service experience so that waiting becomes a positive part of the experience.

The proposed research model also includes mediated effects that could help understand the customer behavioral intentions are formed. The study results demonstrate that perceived overall service quality and perceived value mediated the relationship between full-service restaurant attributes and customer behavioral intention. Perceived overall service quality positively influences perceived value, which predicts customer behavioral intention more accurately than does perceived overall service quality. These results stress that customer behavioral intentions may originate from the attractiveness of restaurant attributes such as servicescape, waiting experience and food quality. Promoting customer perceptions of value thus is the most effective means of enhancing customer behavioral intention (Ruiz, Gremler, Washurn, & Carrio´n, 2008). These indirect paths also imply that customer decision-making is a comprehensive and complex process. These findings suggests that managers should recognize

the impact of each resource and that other resources must interact with each other during service, thus exerting a synergistic effect.

Despite the importance of this study, it suffers undeniable limitations. To ensure external validity, a more comprehensive sample in a dispersive geography is needed in future studies, such as developing a systematic design to better represent the population. Second, using Fuzzy Cognitive Map helps decision makers clearly picture how to establish competitive advantages in the restaurant industry, identify and testify numerous hypothetical situations that might occur in reality to detect a group of desirable outcomes using limited organizational resource. To better understand the relationship between restaurant attributes and consumer behavior, other possible moderators, such as involvement, familiarity, mood, demographic information and situational factors, could also be included in models presented in future studies.

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International Journal of Organizational Innovation

THE EFFECT OF FASHION INNOVATIVENESS ON CONSUMER'S ONLINE APPAREL CUSTOMIZATION

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Abstract

The aim for this paper is to examine the relationships among consumers' beliefs, attitudes and intentions toward online apparel customization in Taiwan. Additionally, the paper explores the moderating effects of fashion innovativeness on consumers' beliefs, attitudes and intentions toward online apparel customization. Research participants were directed to explore the customized jeans website developed by the authors before answering the online questionnaire. Total 303 female students sample were collected. Results identified perceived usefulness and ease of use had significant effects on attitudes toward customized online apparel. Attitudes mediated the relationship between perceived usefulness and behavioral intention but not the relationship between perceived ease of use and behavioral intention. A significant moderating effect by fashion innovativeness was found between consumer attitudes and their behavioral intentions. Attitudes influenced the behavioral intentions of consumers with high fashion innovativeness more strongly than they did for consumers with low fashion innovativeness.

Keywords: Customization, Technology Acceptance Model, Fashion Innovativeness

Introduction

The Economist Intelligence Unit ranked Taiwan second, following the United States, among 66 countries in its "IT Industry Competitiveness Index" (EIU Media Directory, 2008). Taiwan's Ministry of Economic Affairs estimated that the number of general Internet users was 15.14 million in 2008, or 65.8% of the total population of Taiwan. As the number of Internet users increases, the number of online shoppers has also grown rapidly over the last several years. Taiwan's B2C market sales reached US$98 billion in 2006, which was about 3.1% of total retail sales (US$3,156 billion), and they were expected to reach US$241 billion in 2010 (MOEA, 2006). While the market is expanding and maturing, Taiwan's e-retailers' need to differentiate themselves, and customization could be a strategic solution. "Customization" is related to the personalized products/services or shopping experiences created by interactions between firms and customers. Pine, Peppers, and Rogers (1995) argued that "customers, whether consumers or businesses, do not want more choices. They want exactly what they want—when, where, and how they want it—and technology now makes it possible for firms to give it to them (p. 103)." However, firms can achieve such fine segmentation only when they adopt more advanced technologies (Kara & Kaynak, 1997).

Customized Apparel in Online Shopping

Apparel is one of the most suitable products for customization (Goldsmith & Freiden, 2004). In Taiwan apparel was the fourth-largest (11.4%) online product category which had US$11.37 billion in sales (11.6%) in 2006 (MOEA, 2006). Customized apparel has a long history. At one time, fine monogramming, tailoring and other kinds of customized apparel was accessible only to wealthy people who could afford to pay the high prices. The wealthy read fashion magazines, chose their favorite fabrics, and asked their tailors to make the styles. Later,

when companies adopted mass production systems, people at other levels of income began to enjoy fashion and custom apparel at affordable prices. From this modern concept, the pioneer apparel customizer, the US's Levi Strauss used body-scanning technology to offer customization at reasonable prices at its flagship store in San Francisco. Today, with the advent of easily accessible advanced technologies, many e-retailers offer online customization to build and maintain customer relationships (Srinivasan *et al*., 2002).

Taiwan's e-retailers offer a variety of customized apparel including uniforms, men's suits, innerwear, traditional dress and Cosplay (or costume play). However, most of the e-retailers still use traditional methods and have limited online interactions with their customers. Very few of Taiwan's e-retailers offer customized apparel by asking consumers to be involved in the design process, such as by selecting apparel styles, color, and fabric. Recently, a few e-retailers have begun to invest in this approach and have added customization features to their website, but these e-retailers are few and their customization offerings are limited (www.1do.com.tw/default.asp, www.ipaint.com.tw/work/work.asp?kind = 9). More advanced apparel customization is possible for e-retailers who understand what factors influence consumers' willingness to use online customization.

The goal of this study is to identify the determinants of Taiwan's online consumers' behavioral intentions as they relate to customized apparel. In addition, previous researchers have noted the importance of personality traits in understanding consumer behavior as it relates to online shopping (Bosnjak *et al.,* 2007). Personality traits significantly influence choice behavior (Ho *et al*., 2008) and the behavioral intentions (Moon, 2002) related to purchasing customized products and services. Since this paper is aimed at college students' behavioral intentions related to customized online apparel, we pay special attention to the effect of fashion innovativeness as a personality trait. We

designed an empirical study to test a research model based on the Technology Acceptance Model (TAM) with the moderator variable of fashion innovativeness. While previous researchers have examined the TAM using additional variables, few studies have considered the personality traits. We examined the moderating effect of fashion innovativeness on the relationship between consumer attitude and behavior intention in an effort to fill that gap. Thus there are two objective of the study:

1) To examine the influence of consumer beliefs (perceived usefulness and perceived ease of use) on attitudes and behavioral intentions toward customized online apparel.

2) To examine the moderating role of fashion innovativeness on the relationships among consumer's beliefs, attitudes, and behavioral intentions toward customized online apparel.

Review of Literature and Research Hypotheses

The TAM is considered "one of the most influential research models in studying the determinants of information technology (IT) usage" (Chau, 2001, p. 26). The original TAM is rooted in the Theory of Reasoned Action (TRA) which stated (Fishbein & Ajzen, 1975) an individual undertakes a particular action enacted by a behavioral intention that is influenced by attitudes and subjective norms. Attitudes represent the individual's overall evaluations of the behavior. The subjective norm represents the influence of important others. The two components (attitude toward the behavior and the subjective norm) then impact their behavior intentions, which have a direct relationship to consumer behavior. In order to model users' acceptance of information technology, the TAM model modified the TRA by eliminating subjective norms and suggested internal beliefs as the antecedents of the "attitude-intention-behavior" link for external variables (Davis *et al*., 1989). In the TAM model, two constructs of belief are the main determinants of the acceptance of a technology: One is perceived usefulness, which is "the

degree to which a person believes that using a particular system would enhance his or her job performance" and the other is perceived ease of use, which refers to "the degree to which a person believes that using a particular system would be free of effort (Davis, 1989, p.320)." In one of the first applications of the TAM to consumer web adoption, Lee and Turban (2001) found that the TAM predicted individual purchasing behavior online, and Chen, Gillenson, and Sherrell (2002) found the TAM to be effective in evaluating online shopping at a particular "virtual" on-line store. The current study developed a research model by incorporating fashion innovativeness into the TAM. Figure 1 shows the research model and the hypotheses.

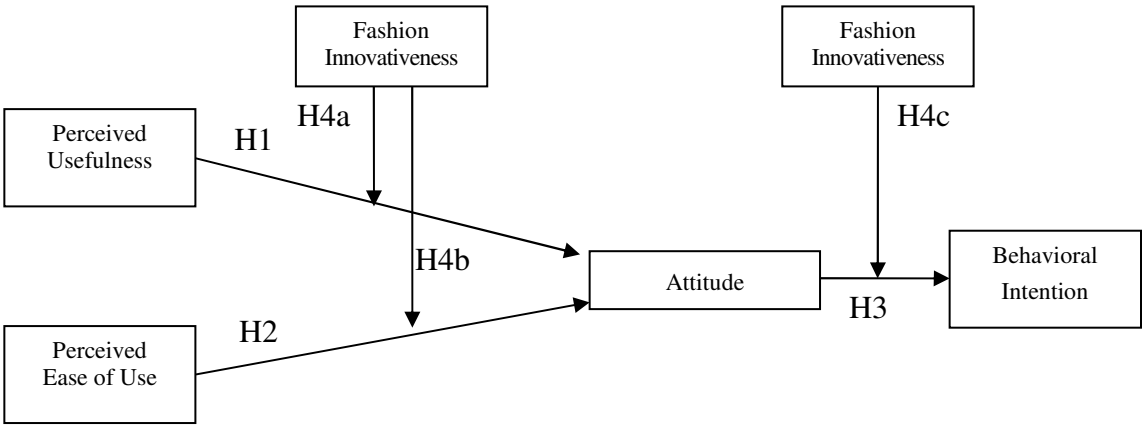

Figure 1. Research framework

Previous studies that have applied the TAM model have found significant relationships between belief variables and attitudes toward different technologies. In the context of Internet service, researchers have found a significantly positive relationship between perceived usefulness and attitude (Gentry & Calantone, 2002). Bruner and Kumar (2005) found a similar positive result for consumer use of mobile services. Researchers have suggested that the importance of perceived usefulness is greater than the importance of perceived ease of use, suggesting that usefulness is the most significant factor in the acceptance of a technology (Davis,

1989; Hu et al., 1999). Perceived ease of use is a construct tied to an individual's assessment of the effort involved in learning and using IT which has been empirically shown to be a critical component of the technology-adoption process (Lin et al., 2007). Thus, we drew the first two hypotheses from this literature review:

H1. Consumers' perceived usefulness of online customization is positively associated with their attitude toward online customization for apparel.

H2. Consumers' perceived ease of use of online customization is positively associated with their attitude toward online customization for apparel.

Schlosser (2003) defined attitudes toward buying online as a consumer's positive or negative feelings about performing the purchasing behaviors on the internet. Online behavioral intentions measure the strength of a consumer's intentions to perform a specific behavior via the internet (Salisbury et al., 2001). Previous research in e-commerce has suggested that attitude plays a crucial role in an individual's behavioral intention (McKnight & Chervany 2002). Njite and Parsa (2005) also found that consumers' attitudes toward online shopping significantly affect purchase intention. Thus, we developed the next hypotheses as:

H3a. Consumers' attitudes toward online customization for apparel mediate the relationship between their behavioral intentions and their perceived usefulness.

H3b. Consumers' attitudes toward online customization for apparel mediate the relationship between their behavioral intentions and their perceived ease of use.

The Personality Trait of Fashion Innovativeness

Researchers have found that personality traits influence attitude and behavioral intention. One of the objectives of this study is to understand the role of personality in the acceptance of online customized apparel. It is not our objective to present a comprehensive theory of personality; instead, we take a pragmatic approach. Therefore, we selected a relevant personality

trait, fashion innovativeness, an indication of the level of willingness to adopt new fashion goods (Park, Burns, & Rabolt, 2007). This concept is reflected in our study measures, which are adopted from Goldsmith and Hofacker's (1991) Domain-Specific Innovativeness scales. Rogers (1995) defined innovativeness as the adoption of a technology at a temporal stage and labeled the first 2.5% adaptors as innovators. However, this time-of-adoption classification bears no isomorphic relationship to individual's personality, so the construct is difficult to operationalize as a personality trait. Midgley and Dowling (1993) provided person-specific definitions of innovativeness in terms of the degree to which an individual is receptive to new ideas and makes innovative decisions independently of the communicated experiences of others. The Midgely-Dowling measure of innovativeness is a contingency approach to modeling innovativeness because an individual's innovative predisposition interacts with the spread of social messages concerning the innovation.

Innovativeness as a personality trait has been well recognized in the literature, and researchers have identified the key characteristics of innovators (Blackwell et al., 2001). Market researchers have studied the earliest buyers of new fashion clothing—the fashion innovators—and their roles as arbiters of fashion (Birtwistle & Shearer, 2001; Crane, 2000). Typically, fashion innovators are people who have specialized knowledge and are experts on fashion products and who legitimize and facilitate the spread of new fashion (Crane, 2000; Creswell, 2001). Goldsmith, Heitmeyer, and Freiden (1991) found younger women are more likely to be fashion innovator and more active in fashion-related behaviors. Moreover, Goldsmith, Flynn, and Moore (1996) using college students as sample and found female fashion innovators considered themselves more excitable, indulgent, contemporary, formal, colorful, dominating and vain that fashion followers. Muzinich, Pecotich, and Putrevu (2003) identified key

determinants of fashion innovativeness, including an innovative personality and information-seeking behavior. Researchers have also found that innovativeness influences online shoppers' behavior. Donthu and Garcia (1999) found that online shoppers are more willing to accept innovative things and take risks, and that online shoppers are more impulsive purchasers and heavier information-seekers than are non-Internet-shoppers. Park, Burns, and Rabolt (2007) found fashion innovativeness and materialism are positively related to the attitude toward purchasing foreign fashion goods online among Korean college students. In their study, internet innovativeness had significant moderating effects. Therefore, fashion innovativeness could have a significant influence on how attitudes and behavioral intentions toward online apparel customization are formed. Therefore, we developed the following hypotheses:

H4a. The level of consumers' fashion innovativeness moderates the relationship between their attitude toward online customization and their perceived usefulness.

H4b. The level of consumers' fashion innovativeness moderates the relationship between their attitude toward online customization and their perceived ease of use.

H4c. The level of consumers' fashion innovativeness moderates the relationship between their attitudes toward online customization and their behavioral intention.

Methods

Measures

All research variables in the model were measured by a seven-point Likert-type scale, with 1 = strongly disagree and 7 = strongly agree. Perceived usefulness (PU) was operationalized with six items to determine whether online customization enhanced an individual's apparel-shopping experience. The concepts were based on the ability to have the work done more quickly, increased productivity, effectiveness, and usefulness (Davis, 1989; Gefen *et al*., 2003). Perceived ease of use (PEOU) was measured with six items based on how easy the website was

to learn; whether it was controllable, clear and understandable, and flexible (Davis, 1989; Gefen *et al*., 2003). Attitude (ATT) was operationalized with five items through the concept of favorable feelings (Moon & Kim, 2001; Robinson *et al*., 2005). An example item is "Using online customization in shopping for jeans is a good idea."

Behavioral intention (BI) was operationalized with six items that focused on degrees of future intention to use online customization (Venkatesh *et al*., 2002; Wang *et al*., 2006). An example item is "I would use online customization in shopping for jeans if it was available." The moderator, fashion innovativeness (FI), was measured using Goldsmith and Hofacker's (1991) Domain-Specific Innovativeness scale, which contains six items. An example statement for FI item is "in general, I am among the last in my circle of friends to buy a new fashion trend item when it appears." Finally, since trust plays a key role in online transactions, we included four items (Bart *et al.*, 2005) about trust in the questionnaire as a control variable in order to obtain accurate results.

Sample and Procedure

The study was conducted using shopping simulations developed to deal with customized jeans. Jeans were suggested as the most appropriate apparel item for customization by university students (Lee *et al*., 2002). Prior to developing the shopping simulation, we investigated apparel-customization websites, including Lands.com and Target.com, and identified the contents and shopping procedures of the sites. Based on the analysis, a researcher designed the contents of the shopping simulation. The basic procedure of customizing jeans in the simulations was composed of three steps: 1) choosing fabric and features; 2) providing body measurements and/or shapes; 3) finishing the order by confirming the final products.

The websites and questionnaire were created in English and then translated into Chinese by a researcher. The pretest was conducted in classroom settings in Taiwan in order to identify any potential problems with the shopping simulation instrument and questionnaire. The pretest results addressed some typos and wording problems, which we corrected. After the pretest, the online survey method was employed to examine the research model. The survey participants were directed to explore a shopping-simulation website before answering a questionnaire. Four questions in beginning of the survey were used to screen the sample which are "what item you customized on the shopping-simulation site," "what is your gender," "what is your age?" and "are you a college student?" The sample was limited to females of college age because: (1) college students have greater internet access (Kim & LaRose, 2004) and online spending (O'Donell and Associates, LLC, 2004) than most other population segments; (2) females are more fashion-conscious than males (Beaudoin, Lachance, & Robitaille, 2003); (3) the homogeneous sample used would permit more exact theoretical predictions than a heterogeneous group (Calder, Phillips, & Tybout, 1981). Participants were given 15 minutes to complete the survey.

The sample consisted of 303 female college students: 196 usable samples were collected by using a quota sampling method from five universities located in different cities in Taiwan, and 107 usable random samples were collected from consumer panels of a marketing firm in Taiwan. Participants' mean age was 21.16 (SD = 2.75), and most of (87%) had at least one online purchase experience in the past.

Analyses

Data were first examined by confirmatory factor analysis using LISREL8 (Jöreskog & Sörbom, 1993). In this procedure, three items of fashion innovativeness were deleted because they

had standardized factor loadings less than .50 which suggested by Bagozzi and Yi (1988) to increase the validity of the measures. Next, linear regression analysis using SPSS 14.0 was applied to test the hypotheses. In this analysis, trust was added as a control variable to avoid common method variance in the model. Harman's single-factor test (Harman, 1967; Podsakoff *et al.*, 2003) and partial correlation procedures were performed that suggested that controlling with trust is appropriate. After removing the impact of trust, the correlations between PU and ATT (.69 to .43) and PEOU and ATT (.51 to .17) were dropped.

Results

The means, standard deviation, Cronbach's alphas and bivariate correlations of research variables are presented in Table 1. Significant relationships were found among the research variables: The dependent variable, attitude toward online customization, was positively correlated with consumers' PU ($r = .69$, $p < .01$) and PEOU ($r = .51$, $p < .01$), and the moderator variable, FI, was positively correlated with PU, PEOU, ATT, and BI.

Table 1. Descriptive Statistics and Correlation Matrix among Variables

Variable	Mean	SD	α	1	2	3	4	5	6
1. PU	4.51	1.24	0.93						
2. PEOU	5.23	1.03	0.91	.58**					
3. ATT	4.26	1.34	0.95	.69**	.51**				
4. BI	4.20	1.06	0.88	.58**	.40**	.69**			
5. FI	3.93	1.22	0.84	.15**	.12*	.22**	.15**		
6. Trust	4.76	1.00	0.91	.68**	.61**	.67**	.59**	.18**	.32**

Note: Listwise excluded, $N = 303$. **$p<.01$. *$p<.05$, two-tailed.

Linear regression analyses were conducted to test H1 and H2. As shown in Table 2, the results supported both H1 and H2. With the control variable Trust in the model, both PU's change in R^2 ($\Delta R^2 = .11$, $p < .01$) and PEOU's change in R^2 ($\Delta R^2 = .02$, $p < .01$) were significantly associated with ATT. While both independent variables had significant effects on attitude, comparison of the

results in the models indicated that PU (β = .47, p< .001) was more significantly associated with ATT than PEOU (β = .20, p< .01).

Table 2. Regression Results of Consumer Attitude toward Online Customization

Variables	*F*	*df*	Model 1		Model 2		$_{adj}R^2$	$\triangle R^2$
			β	*t*	β	*t*		
Constant			-.28	-1.11	-.48	-1.53		
Control Var.: Trust			.51	7.29***	.78	10.83***		.45***
PU	186.93***	300	.47	8.30***			.55	.10***
PEOU	131.69***	300			.20**	2.91**	.46	.02**

Note: Unstandardized Betas are reported from the final step. *N* = 303. ***p<.001.**p<.01. $\triangle R^2$ = change in R^2.

The Mediating Effect of Consumers' Attitudes toward Online Customization

H3a and H3b were tested using the three-step regression procedure for mediation suggested by Baron and Kenny (1986). The regression results with PU as independent variable are shown in part I of Table 3. In the first step, regressing ATT on PU brought a significant result (β = .47, p< .01). Next, we regressed BI on PU and also found a significant result (β = .28, p< .01). Finally, we regressed BI on the mediating variable (ATT) with PU. The results of the third step indicated that ATT was significantly related to BI when the independent variables were included in the regression equation (F = 57.65, p< .01). In this result, PU had a non-significant beta weight, so we concluded the complete mediation of ATT in the relationship between PU and BI. This result supports H3a.

The regression results of PEOU as the independent variable are shown in part II of Table 3. In the first equation, we regressed the ATT on PEOU and found a significant result (β = .20, p< .01). In the next step, we regressed the BI on PEOU and found no significant result (β = .06, p> .05). According to Baron and Kenny (1986), we can determine either partial or complete

mediation when all the equations in the three steps are significant but, since the equation in the second step was not significant, H3b is not supported.

Table 3. Regression Analyses for Examining the Effect of Attitude on Behavioral Intention

Part I	Independent Variable		Dependent Variable	*F*	*df*	*β*	*t*	$_{adj}R^2$
Equation 1	Constant					-.28	-1.11	.55
	Control	Trust	ATT	186.93***	300	.51	7.29***	
		PU				.47	8.30***	
Equation 2	Constant					1.06	4.57***	.40
	Control	Trust	BI	102.88***	300	.40	6.21***	
		PU				.28	5.36***	
Equation 3	Constant					1.16	5.51***	.51
	Control	Trust	BI	103.66***	299	.20	3.21**	
		PU & ATT				.10 .38	1.88 7.93***	
Part II				*F*	*df*	*β*	*t*	$_{adj}R^2$
Equation 1	Constant					-.48	-1.53	.46
	Control	Trust	ATT	131.69***	300	.78	10.83***	
		PEOU				.20	2.91**	
Equation 2	Constant					1.08	3.91***	.35
	Control	Trust	BI	81.44***	300	.59	9.48***	
		PEOU				.06	.93	

Note: Unstandardized regression coefficients from the final step. $N = 303$. ***$p<.001$.**$p<.01$. *$p<.05$.

Moderating Effects of Fashion Innovativeness

Hierarchical moderated multiple regression analysis (Cohen & Cohen, 1983) was used to examine the moderating effect of fashion innovativeness. Since there were no significant interaction effects between FI and PU for ATT on one hand, and FI and PEOU for ATT on the other, both H4a and H4b are not supported. To examine H4c, we first entered the control variable into the equation, then entered the independent variable, ATT, then entered FI as a moderator, and finally entered the interaction term (ATT × FI). Results are shown in Table 4. The interaction term of attitude and innovativeness was significant and explained a significant incremental

portion of variance ($\triangle R^2$ = .01, p< .05). Thus, H4c is supported.

To explain the relationships among ATT, FI, and BI, we plotted the high and low levels of attitude for high and low fashion innovativeness, presenting the means of prediction-of-behavior intention scores (Stone & Hollenbeck, 1989) in Figure 2. Results indicated students who have higher level of attitude toward online customization and higher fashion innovativeness tend to have higher behavioral intention than who have lower fashion innovativeness (4.82 vs. 4.65). A reverse trend was shown for lower level of attitude toward online customization; that is, students with lower attitude toward online customization and lower fashion innovativeness tend to have higher behavioral intention than those who have higher fashion innovativeness (3.72 vs. 3.51).

Table 4. Hierarchical Moderated Regression Results for Behavioral Intention

Variables			*F*	*df*	β	R^2	$\triangle R^2$
Equation	Independent	Dependent					
Constant					2.17**		
Control variable	Trust				.26**	.35	.35**
Step 1 Equation 1	ATT	BI	152.43**	300	.19	.50	.15**
Step 2 Equation 2	FI	BI	101.29**	299	-.25 *	.50	.00
Step 3 Equation 3	ATT x FI	BI	78.66**	298	.06*	.51	.01*

Note: Unstandardized regression coefficients from the final step.
N = 303. **p<.01. *p<.05. $\triangle R^2$ = change in R^2 ; Y = 2.17 + .26(Trust) + .19(ATT) + (-.25) (FI) + .06 (ATT x FI)

Discussion and Conclusion

We found that Taiwan's college students' beliefs regarding the usefulness and ease of use of online customization influence their attitudes toward the application. This finding is consistent with previous studies that identified the two belief variables, perceived usefulness and perceived ease of use, as

major determinants of positive attitudinal and behavioral consequences for the acceptance of a new technology (Dabholkar & Bagozzi, 2002). Similar to previous researchers have suggested that the role of perceived usefulness is more significant than perceived ease of use in the acceptance of new technology (Hu *et al.*, 1999), our results also indicated that consumers' perception of usefulness have a stronger influence on attitude and behavioral intention toward online apparel customization than does perception of ease of use. In addition, the mediating effect would only find for the relationship between perceived usefulness and behavioral intention, and not for the relationship between perceived ease of use and behavioral intention.

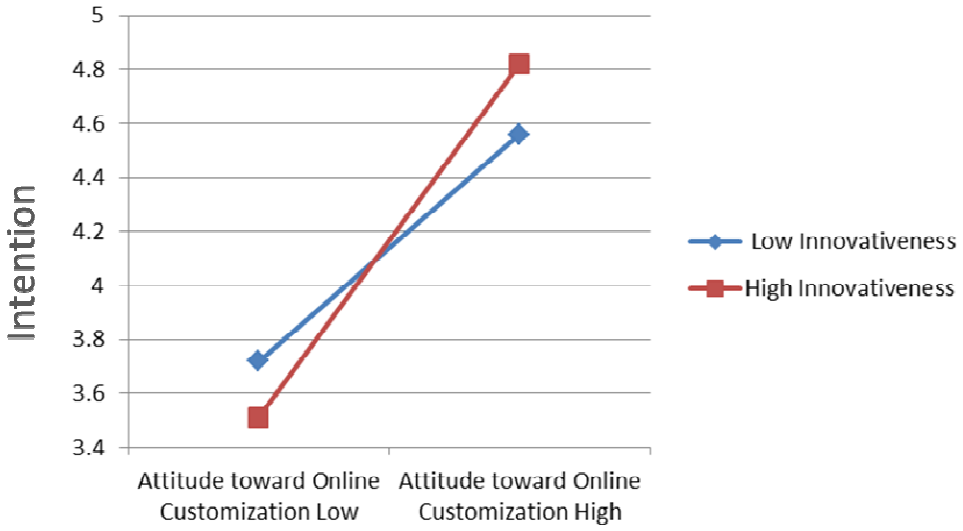

Figure 2. Interactive Effect of Fashion Innovativeness and Attitude toward Online Customization on Consumers' Behavioral Intention

In this study we found no significant moderating effect by fashion innovativeness in the relationship between the belief variables and attitude. However, the role of fashion innovativeness was identified as a moderator of the relationship between attitude and behavioral intention. These results suggest that fashion innovativeness is more involved in formulating behavioral intention than influence attitude toward customized online apparel. Further analysis using the plot in Figure 2, revealed that the

behavioral intention of consumers with high fashion innovativeness is influenced by their attitudes more than is behavioral intention of consumers with low fashion innovativeness. Fashion innovators are heavy information-seekers and are regarded as fashion experts who have a significant amount of knowledge (Muzinich, *et al.*, 2003). Since fashion innovators are confident in their established attitudes, they have a greater behavioral intention when they build stronger positive attitudes. On the other hand, people who are low in fashion innovation are less confident, so their behavioral intentions do not change greatly, regardless of their attitudes.

While few studies have considered personality traits using TAM, this study considered fashion innovativeness in its attempt to understand female college students' acceptance of customized online apparel. The study has practical implications for Taiwan's apparel e-retailers who are considering developing a customization website to differentiate their market. As the result indicated Taiwan consumers would have higher level of behavior intention when the website is useful and effective during the process of shopping customization online apparel, since the benefits of customization is its ability to create a value that exactly fits an individual's desires, Websites can improve consumers' shopping performance by providing more design options in terms of textiles materials, color, pattern, style, size, and so on.

Since consumer's PEOU would influence consumers' attitude the website interface should be easy to operate and understandable by a wide range of customers. Website designers should note consumers' differences and need to provide easy operation of the customized apparel shopping procedure. Taiwan e-retailers should promote the website and build positive attitudes among fashion innovators because their adoption of the technology will influence others. While fashion innovators with highly positive attitudes will be more willing to accept customized online apparel, strategies may include improving the product and service quality, establishing a

brand image and promoting the brand to increase consumers' awareness, and featuring the latest fashions to increase consumers' willingness to surf the website and their buying desire.

This study was conducted with some limitations. First, the shopping simulations we developed for this research used only jeans; therefore, the results should be reconfirmed in future studies using different apparel categories. Second, our sample included only female college students in Taiwan, future studies may need to validate our finds by considering broader demographical samples in different countries. Finally, since this study concentrated on the moderating effect of one personality trait, fashion innovativeness, applying the TAM model, future researchers can extend the model with other traits to explore the effects of other personality traits that may influence consumer behavioral intention toward customized online apparel.

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DEVELOPING THAINESS CAPITAL FOR A FIRST-IMPRESSION "SERVICECONOMICS" MIND MAP

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Abstract

This paper posits that "Thainess Capital" could provide a unique competitive advantage for Thailand in today's global, creative economy. This creative economy is a paradigm shift that embraces economic, cultural, technological, and social aspects of development. "Thainess capital" could become an economic driver for fostering national intellectual capital for national brand building, which can benefit the Thai economy. As a key economic multiplier, it could stimulate value creation in a knowledge-based service economy. The purpose of this paper was to develop an intellectual capital (IC) conceptual framework, namely "Thainess capital (TC)." The empirical part of this study is based upon face-to-face in-depth interviews, including observation, with case studies of 5 leading world-class hospitality service providers in Thailand: The Mandarin Oriental Bangkok Hotel, Chiva-Som Spa, Blue Elephant Restaurant, Jim Thompson Thai Silk and Thai Airways International. Thai normative values, beliefs and local wisdom, reflecting the unique cultural characteristics and behaviors of Thais, were investigated. We explored the cognitive platform to create a first-impression, body service language that should provide benefits for national branding. The Mind Map by Buzan (1974) was utilized to model the First-impression "Thainess Serviceconomics" Mind Map.

Keywords: Creative economy, Thainess service language, Intellectual capital, Knowledge management, First-impression, Thainess capital, Serviceconomics.

Introduction

Due to ongoing globalization, Thai society may be in danger of losing its cultural heritage. At the current rate it is likely that the next generation will have little awareness of their own "Thainess", or cultural uniqueness. Furthermore, the industrial era and global capitalism, with an emphasis on materialism, individualism, and consumerism, has created more stress for people and provided them with less overall happiness.

The purpose of this research was to develop the "intellectual capital" (IC) conceptual framework, which will be called "Thainess capital." Thainess capital will provide a cognitive platform for providing recommendations aimed at supporting Thailand's efforts to achieve greater labor mobility within the ASEAN Economic Community (AEC) by 2015.Thai collective values and beliefs that reflect the Thai people's characteristics and behaviors also were investigated. This study also explored the meta-cognitive platform for creating a first-impression service language. The Thainess capital model focuses on the nonverbal transmission of attitudes, beliefs, and cultural expressions, which serve as the means for transmitting Thai culture as a form of human intellectual capital. The implication is that THAINESS CAPITAL is important for the creation of value in the Thai culture.

Important cognitive tools, namely the "Mind Map" developed by Buzan (1974) and Neuro Linguistic Programming (NLP) by Bandler (2008), have been utilized and extended to model THAINESS CAPITAL as a way of creating a new training method. This training method should prove useful as a part of human resource development (HRD) for both local and international companies operating in Thailand. The "Thainess Serviceconomics Mind Map" (TSMM) model has been designed in such a way that it should synergize the "creative economy" success factor of lessons learned from Western experiences as well as Thai social cognition. The

empirical study of the thesis was based on a thorough historical analysis, followed by face-to-face in-depth interviews, codified observation of body language, and personal characteristics by independent raters monitoring the case study interviews of the five leading world-class hospitality services in Thailand, namely The Oriental Bangkok Hotel, Chiva-Som (spa), Blue Elephant Restaurant, Jim Thompson (silk), and Thai Airways.

During the past decade, Thailand has accelerated the growth of its industrial sector in terms of production, management, and marketing. Thailand has become a major tourism center for Asia, and in particular a hub for Southeast Asia .The country is also projected to become a center for fashion, jewelry, health science, and health care. These services are only one way that Thailand has developed, because Thailand also aims to become a center for innovative food products. This is all because the country has a solid reputation for food production and agricultural produce processing. It is also the originator of distinctive Thai foods, or Thai cuisine. According to Hongladarom (2009) of the Foundation for International Human Resources, the lack of a focus on Thainess "intellectual capital" has been one of the most critical problems in human resource development for the nation. Therefore, in this study, it has been our aim to study what is meant by "Thainess", and establish a new cognitive platform for "Thainess intellectual capital" development, called the "Thainess capital" (TC). TC can hopefully be utilized as a new cognitive tool for supporting Thailand's competitiveness and efforts towards achieving greater labor mobility within ASEAN in the AEC by 2015. New training methods, based upon the TSMM, could be constructed that adopt the best practices based on Western style management and ideas, while simultaneously incorporating the collective values of Asian culture and "Thainess capital" in balanced proportions.

The research hypotheses of the empirical study were:

Hypothesis 1: The organizational culture, as stimuli, can support positive first-impression formations, such as vision and mission of the organization, symbolic objects, uniforms, the reputation of the organization, and the organizational back-story.

Hypothesis 2: Physical attributes of the actors can be used to support a positive first-impression formation, by emphasizing such factors as: body language, smiling, tone of voice and gestures, physical attractiveness, physical appearance, age, gender, and race.

Review of Literature

Although travel and tourism is a highly competitive industry, there is a paucity of academic research on destination branding (Pike, 2005). One of the aspects of this study was to present a branding framework for designing successful destination strategies. Therefore, this exploratory research sought to determine key factors that affect the strategic branding of destinations. International competition is fierce, with 194 nations each vying for a share of the global tourism market. This indicates a need for a more strategic approach to branding,as brand position leads to greater economic value (Matear et al., 2004; Davis, 2002), growth and welfare. A study by Fan (2006) and cited by Balakrishnan (2009) found that brand owners outperformed their OEMs in terms of profits by a ratio of 50:1. A strong international marketing strategy improves financial and brand performance through identification and achievement of specific brand values (Wong and Merrilees, 2007; Meenaghan, 1995).

The experience economy

A new kind of economy–the experience economy–is emerging in which increasing numbers of industrial practitioners realize the importance of capitalizing on the customer experience (Pine & Gilmore, 1999). Pine and Gilmore (1999) conceptualized the customer experience as comprising entertainment, education, escape, and aestheticism. These four categories differ according to the distinct level of their absorption into and participation in the

products and services on offer. Capturing the theme of experiential value, Schmitt (1999; 2003) suggested that industry pursue experiential marketing management in an effort to manage the customer's entire experience of a product and a brand. He disassembled experience into five types: sense, feel, think, act, and relate. Sense experiences enable customers to satisfy their need for aestheticism. Feel experiences refer to customers' perceptions of fun and pleasure. Think experiences satisfy customers' desire to seek opportunities to broaden their knowledge and learn new things. Act experiences reflect their personal ties with a brand and company, which helps them to develop individual actions and lifestyles. Finally, relate experiences involve the social networks and interrelationships among customers, which then produce a feeling of belonging to the community and to society. Cai and Hobson (2004) adapted and extended the experience economy and experiential marketing concepts to the accommodation industry. They provided a four-state continuum of the lodging marketplace by equating the state of experience as the fourth economic progression along with that of brand. In a similar vein, in the experience economy, a successful hotel brand aims to ensure positive and multidimensional experiences for its guests so as to win a differentiated position in their minds. For instance, Langham Hotels are promoted on their websites as creating new hospitality experiences that exude graceful and timeless elegance, and blend a sense of the past with the contemporary. The Marco Polo Hotels' website similarly states that guests are warmly welcomed to their "home" and offered an authentic hospitality experience.

In today's experience economy, there is an economic transformation from service toward experience (Pine and Gilmore, 1999). This requires the pragmatic implementation of experiential (Schmitt, 1999) and hedonic marketing (Holbrook and Hirschman 1982; Hirschman, 1984). The studies of experience in the tourism and hospitality industry have mainly been based on five

models (Prentice *et al.*, 1998). The primary model is the exploration of tourist typologies, including the package of sociological and psychological needs that tourists desire to fulfill through traveling. For instance, Cohen (1979) discussed five types of tourism: recreation, diversionary, experiential, experimental, and existential. Tourists who desire recreational and diversionary experiences are likely to seek out opportunities for pleasure and entertainment, whereas tourists of the latter three types prefer to learn about different cultures or acquire new skills (Uriely & Belhassen, 2005). Similar studies have examined the leisure experience (Mannell & Iso-Ahola, 1987). In fact, these different types of experiences show that tourists have a wide range of needs that are located at different levels of Maslow's hierarchy of needs (Maslow, 1943, 1970).

Quality of Experience (QoE).

Klaus and Maklan (2007) maintained that a superior and profitable brand in today's service-dominated competitive world delivers QoE rather than quality of service. There is a paucity of knowledge about the experiences of hotel guests. McIntosh and Siggs (2005) suggested that customers in the hotel industry are concerned with whether their experiences have a unique character and are personalized, homely, of quality, and value-added. Zins (1998) successfully explored guests' experiences as related to the satisfaction of their personal needs in five middle- and upper-class theme hotels in Austria. The psychographic concepts therein explained customers' intrinsic needs, paralleling Maslow's hierarchy of needs (Maslow, 1943, 1970), and push motivational factors. Otto and Ritchie (1996) also identified four experience dimensions of hotel services, namely, hedonics, peace of mind, involvement, and recognition. These four dimensions of the hotel stay experience were presented in ascending order, as per Maslow's hierarchy (Maslow, 1943, 1970). In a more recent study, Oh, Fiore, and Jeoung (2007)

explored hotel guest's experiences in the U.S. bed and breakfast industry, a special category of the hotel industry. This exploratory work was based on Pine and Gilmore's (1999) four conceptual realms of experience: entertainment, education, escape, and aestheticism.

Self-presentation

Thainess intellectual capital should be created from Thai normative wisdom, the values and beliefs of the Thai people, attitudes about self-presentation appearance, and behaviors from everyday life which create the best performance. Thainess intellectual capital creation is associated with originality, imagination, inspiration, ingenuity and inventiveness from the inner mental model represented by Thais' identity and values, employed for delivering the best service-mindedness and expressing creative hospitality ideas; it is associated with tacit knowledge, those intangibilities which are the key essence of Thainess intellectual capital. It is involved with knowledge management of Thai creativity, culture, and economics, and is centered on the service dominance of the Thai economy.

Nonverbal communication

Mehrabian (1969) first introduced the term immediacy cues, which includes eye contact, interpersonal distance, body lean and orientation, and defines immediacy as "communicative behaviors which enhance closeness to another" (Mehrabian, 1969, p. 203). According to Mehrabian (1971), nonverbal immediate behaviors are actually abbreviated forms of approach and avoidance. For example, the lifting of a hand to greet someone at a distance is an abbreviated reach to touch, while pushing back in a chair when one wants to end a conversation may be considered an abbreviated movement of departure. Variations of these behaviors create the closeness associated with immediacy and contribute to the verbal messages of the sender.

Mehrabian also stated that individuals' behaviors could contribute to feelings of like or dislike and could make the interactional partner feel either good or bad about self.

Rifkind and Harper (1993) found that nonverbal immediacy behaviors include: (a) eye contact, (b) relaxed body posture and positioning, (c) gestures, (d) smiling, (e) facial and vocal expressiveness, (f) appropriate touching, and (g) physical proximity. During a communicative encounter, nonverbal affect is both encoded and decoded within the interaction. Along with the verbal message, receivers base their opinion of the message sender on these nonverbal cues. Regardless of the verbal message presented, individuals rely heavily on the information sent through nonverbal channels to ensure that the perceived actions match the words of the message sender, indicating that verbal messages are less important than nonverbal immediacy behaviors. Mehrabian (1971) stated that individuals could generally establish an impression in terms of the immediacy principle: "People are drawn toward persons and things they like, evaluate highly, and prefer; and they avoid or move away from things they dislike, evaluate negatively, or do not prefer" (p. 1). Behaviors contribute to this feeling of like or dislike; through a series of immediate behaviors, one is able to make a conversational partner feel either good or bad.

Intercultural Communication

Chen and Starosta (1998) defined intercultural communication as "the communication between people from two different cultures" (p. 28). Intercultural communication reflects communication between two or more individuals from different cultures through the exchange of interacting, sharing, and interpreting information. The best outcome for intercultural communication may occur when people encounter cultural differences between one another and interact favorably despite these differences. One consistent factor that distinguishes intercultural communication from other forms or types of communication is the relatively high degree of

difference in the cultural and experiential backgrounds of individuals. Kim (2001) explained that intercultural communication employs the concept of the stranger to integrate various types of intercultural situations into a continuum of "interculturalness", with differing degrees of cultural difference, unfamiliarity, and psychological distance involved in specific communication encounters (p. 140).

Condon and Yousef (1975) asserted that we "cannot separate culture from communication, for as soon as we start to talk about one we are almost inevitably talking about the other, too" (p. 34). Thus, intercultural communication includes cultural communication, which focuses on understanding communication within a particular culture. Hall (1976) identified two dimensions of culture that influence intercultural communication: individualism-collectivism and high and low context. These are factors that varyd across cultures.

The role of actor cognitions in the impression management (IM) process can be summarized as follows: Jellison and Green (1981) proposed a behaviorist perspective of self-presentation that discounts internal cognitions and stresses the impact of the external environment, whereas Bandura (1977) proposed a social learning theory perspective that emphasizes the interactive relationship between the environment, people, and behaviors.

IM theory and research indicates that a variety of cognitive variables shape the actor's behaviors. Self concept research suggests that individuals unwittingly develop constructs about themselves as a person (Schlenker, 1980). People develop self-constructs (e.g. happy-sad, dominant-submissive) through self-observation as well as through the reflective appraisals of others. The sum and configuration of these self-constructs forms the individuals' global self-concept (Schlenker, 1980).

Causal Attributions

Organization members routinely invoke attribution processes to develop explanations for events, behaviors, and outcomes that assist them in defining the situations they find themselves in (Weary and Arkin, 1981).

Cognitive Scripts

Cognitive scripts involve "a hypothesized cognitive structure that provides a guide to appropriate behavior sequences in a given context", they assist both the actor and the audience in defining the situation (Gioia & Manz, 1985). Scripts are learned and refined through repeated social exchanges sharing similar elements or patterns. Scripts can also be learned vicariously by watching the behavior of others. When members perceive similar sets of stimuli, scripts assist them in defining the situations by specifying episodic series of events. Although people often adhere to scripts unconsciously such as in routine greetings, actors may also consciously scrutinize scripts until they find one that fits the situation and is considered likely to create a favorable impression (Gioia & Manz, 1985).

Role Expectations

The perception of audience expectations and self concepts assist actors in defining their performance roles (Schlenker, 1980). Organizational members occupy a variety of roles, namely: superior, customer service, salesperson, receptionist, etc. Members learn cognitive scripts for these roles and employ these scripts in order to satisfy audience expectations (Gioia & Manz, 1985). The subset of roles that actors assume is constrained by their characteristics as well as the audience's knowledge of their backgrounds, brand image, and reputations.

Self Presentation and IM Behaviors

The most outstanding type of IM behavior is self-presentation, which involves the manipulation of information about self (Schneider, 1981). Organizational members use self-

presentation strategies to directly present themselves to targeted audiences. Three types of self-presentation behavior, identified by Schneider (1981), can be summarized as follows:

1. Nonverbal Behaviors - Nonverbal behaviors such as facial expressions, gestures, body language, tone of voice, and interpersonal distance play major roles in the IM process.

2. Verbal self-presentation - Seven types of verbal self-presentation are focused on (Jones and Jones, 1964; Wood and Mitchell, 1981). These are: self-descriptions, opinion conformity, personal accounts, apologies, acclamations, further enhancements, and favors.

3. Alternative IM tactics - Members use altered third party presentations when direct presentations appear to be too obvious, or are insufficient to achieve desired impressions (Wortman & Linsenmeier, 1977).

Purposive versus Non-purposive Behavior

One of the key dimensions upon which IM behavior varies is purposiveness. IM research has focused primarily on purposive behavior that involves the application of specific verbal, nonverbal and artifactual behaviors for the purposes of impression formation (Schneider, 1981). However, Tetlock and Manstead (1985) argued that actors often unconsciously engage in IM without being aware of their behavior. In such cases, IM is the product of over-learned habits and cognitive scripts. Therefore, if this is truly the case, then this behavior appears to be non-purposive in that it occurs automatically without conscious control (Schlenker, 1980). Jones and Pittman (1980) have identified ingratiation, self-promotion intimidation, exemplification and supplication as self-presentation strategies that correspond to the motives of being perceived as attractive, competent, dangerous, morally worthy, and pitiful, respectively. Jones (1964) defines

ingratiation as "a class of strategic behaviors illicitly designed to influence a particular other person concerning the attractiveness of one's personal qualities" (p. 11). Kipnis et al., (1980) found that ingratiation is used frequently to impress subordinates, peers and superiors. In addition, ingratiation is related positively to audience attractiveness, status, and power (Jones & Wortman, 1973).

In this study, we wanted to demonstrate that mind-mapping and other meta-cognitive concepts, such as NLP, are the right tools to establish the innovative service language platforms (called TSMM), as the way to synergize the global best-practice standards within the "Thainess" collective values. Furthermore, we wanted to demonstrate that the "creative economy" concept can be merged with Thainess collective values, and their collaborative effects can provide high levels of customer satisfaction in Thailand.

Based on the understanding that a first-impression cultural exchange can facilitate cross-cultural understanding, this study was designed to examine how Thainess, as cultural branding, would support and contribute to the new service language knowledge creation and how the mind-map facilitates the Thai people's intellectual capital as national competitiveness branding in the creative economy. The researcher assumed that the consistent implementation of Thainess is at the core Thainess intellectual capital, which is at the center of local competency. Furthermore, this should be instrumental in influencing other global citizens from around the world to appreciate the aesthetic service language at the micro level, and assist in maintaining the goodness and the beauty of the cultural practices at both local and global levels.

Methods

Design

The empirical study of this thesis has been based upon a thorough historical analysis of the factors affecting each company's success, followed by face-to-face, in–depth interviews with observations of key informants involved in five leading, world class hospitality service companies in Thailand: namely, the Mandarin Oriental Bangkok Hotel, Chiva-som, Blue Elephant Restaurants, Jim Thompson and Thai Airways. The researcher chose the key informants from a purposeful sampling of those who were both experienced in, and involved at, the management level in one of these five world-class hospitality service companies.

The triangulation method was utilized in this qualitative study, including multiple methods of both data collection and analysis (Creswell and Miller, 2000, p. 126).We then summarized the interviews by content analysis. If the findings from all of the methods drew the same or similar conclusions, then the findings were reported, because the validity of these qualitative results had been established.

For this study, the researcher organized the research methodologies into the following three categories: 1) documentary studies: gathering information from journals and theoretical texts, thoughts, and concepts from many well known academic publishers. As in any such qualitative research, the aim was to "engage in research that probes for deeper understanding rather than examining surface features" (Johnson, 1995, p. 4), and constructivism may help to facilitate that aim; 2) internet based information gathering: obtained by searching reports, data analysis and relevant research of topics that are in accordance with this thesis. The researcher searched for timely information and rechecked that information to ensure its relevance in order to have up-to-date information to summarize the research; 3) in-depth interviews: further information was gathered by using semi-structured, open-ended questions as part of the interview tool.

Setting, Sample and Participants

The case studies were drawn from five world-class leading hospitality service companies that operate in Thailand. They were chosen purposefully because they have consistently been award-winning representatives of the best practices for the industry. They tend to represent the highest quality service available, and therefore may not necessarily be representative of the entire industry, which may limit generalizability of the results to the remainder of the Thai service economy. Also, research has shown, time and time again, that estimates derived from large samples are more reliable than estimates derived from small samples. The researcher completed five case studies from the following organizations: 1) Blue Elephant Restaurant, for which the key informant was the restaurant manager; 2) Chiva-Som, for which the key informant was the Sales and Marketing manager; 3) Mandarin Oriental Hotel, for which the key informants were: the OHAP's school manager, the Human Resources Director, an Executive Thai Chef, the Training Manager's Assistant, and the Guest Relations Consultant; Jim Thompson, for which the key informant was the Shop Manager of the Surawong Branch; and Thai Airways, for which the key informant was the manager of the organization's international learning and development section.

With a set of semi-structured, open-ended questions, the researcher then created an analysis of knowledge management as a tool, which was utilized for modeling "Thainess service language". As an intellectual capital value creation for the creative economy, the model was based on the mental literacy tool known as mind-maps, which were first developed by Buzan (1974). The questionnaire did not have a fixed ordering or a set number of questions. The questions came from selective points of view and the general questions were sourced from academic journals, the researcher's professional experience, and the theoretical concepts which

underpin the framework of the research. The researcher asked each respondent to express an opinion regarding particular subjects or issues; thus it was easier for the respondents to explain the many nuances of their thoughts and feelings. Direct survey interviewing was applied in this study. In direct interview surveys, the researcher maintained direct communication with the respondent and was thus able to provide feedback, observe reactions, repeat questions, or ask for additional information. Both face-to-face interviews and telephone interviews were used. Additional surveys in this study involved historical content analyses of the secondary knowledge base, and were mostly derived from written documents.

Measures: Setting the Questionnaire's Scope and Creating the Tools

The researcher set the basic conceptual framework and the topics following the theme of first impression management for intellectual capital development. Searches of various sources of information were used to make the system matrix table. Therefore, after analyzing the data, we are able to fix data into the conceptual framework.

The research questionnaire was open-ended, and the main topics covered many sources of information. The related topics consisted of three parts. The first part was about the "Thainess first-impression" which operates in Thailand. The second part was a sensory and cognitive study based on both the human and cultural capital employed in each company. The third part was about the training and learning employed to create intellectual capital.

During the interviewing, the researcher attempted to formulate deeper questions without using leading questions, to widen the scope. Thus the respondent could feel free to give additional information with their own ideas. The main questions were wide ranging and were formulated as follows: first, making a good first impression in their organization, which contained three main questions: a) What is the meaning of first-impressions in your

organization? What contributes to first-impression management? What are the key collective Thai values utilized as the parameter of first impressions? Second, how was Thainess involved in creating a good first impression in their organization, which contained with three main questions: How can Thainess be used to create a good first-impression? Which Thai values are involved in their language services? How can service-mindedness help to create a good first-impression? Third, what is the overall role of the organization's intellectual capital utilized for value creation, which contained three main questions: What is the specific role of human capital (for example, body language) in creating a high value first impression, thus promoting higher customer satisfaction? What is the role of the organization's financial capital, i.e., advertising and public relations? And finally, what is the role of social capital, i.e., the posited collective values in Thai society?

Follow-up questions asked for deeper additional information. This was necessary because it was possible that by only asking the main questions the researcher would not get the maximum amount of useful information from the respondents, so they were allowed to give wide-ranging answers as they saw appropriate. However, the researcher was aware that the follow up questions could not be or construed in the same way as the main questions. Open-ended interviewing was the key factor that elicited the most relevant information from each respondent, so each question had to be given due consideration particularly with regards to information that the researcher has already acquired and reviewed. This contributed to the content validity of the study.

Further research objectives, expressed here as specific questions, were pursued in a colloquial interview guide question format.

1) Which of the six senses contribute to cognitive knowledge creation in the creative economy framework?

2) Can mind-mapping tools be utilized effectively to establish a new service language protocol?

3) How well can the synergy of cross-cultural links between local and global standards be optimized to achieve world-class best- practice in service modeling?

4) How do Thai people become aware of, and experience, Thainess values and identities in terms of their thinking, feelings, and behavior?

5) How can "Thainess intellectual capital", as a visual-multisensory representation, be utilized for good first impression formation for the co-creation of brand identity that can generate added value to national branding?

Procedure for Data Analysis

The researcher used observational studies based on Goffman and other symbolic interactive studies of IM throughout the use of observational techniques. This methodology involves the researchers observing many and varied interactions, looking for patterns, and then summarizing the patterns in a model. Observational researchers carrying out observational studies must attempt to be as structured and scientific in their collection and analysis of the data as possible given the limitations imposed by this method.

In order to attain the sense of identity, the questions were based on the cognitive sensory information and linked to experiential emotions in order to explore the first impression formation derived from "Thainess intellectual capital". Due weight was given to how each case study could be used to communicate their intellectual capital, comprised of human capital (interpersonal communications), organizational capital (branding), and relationship capital (rapport).

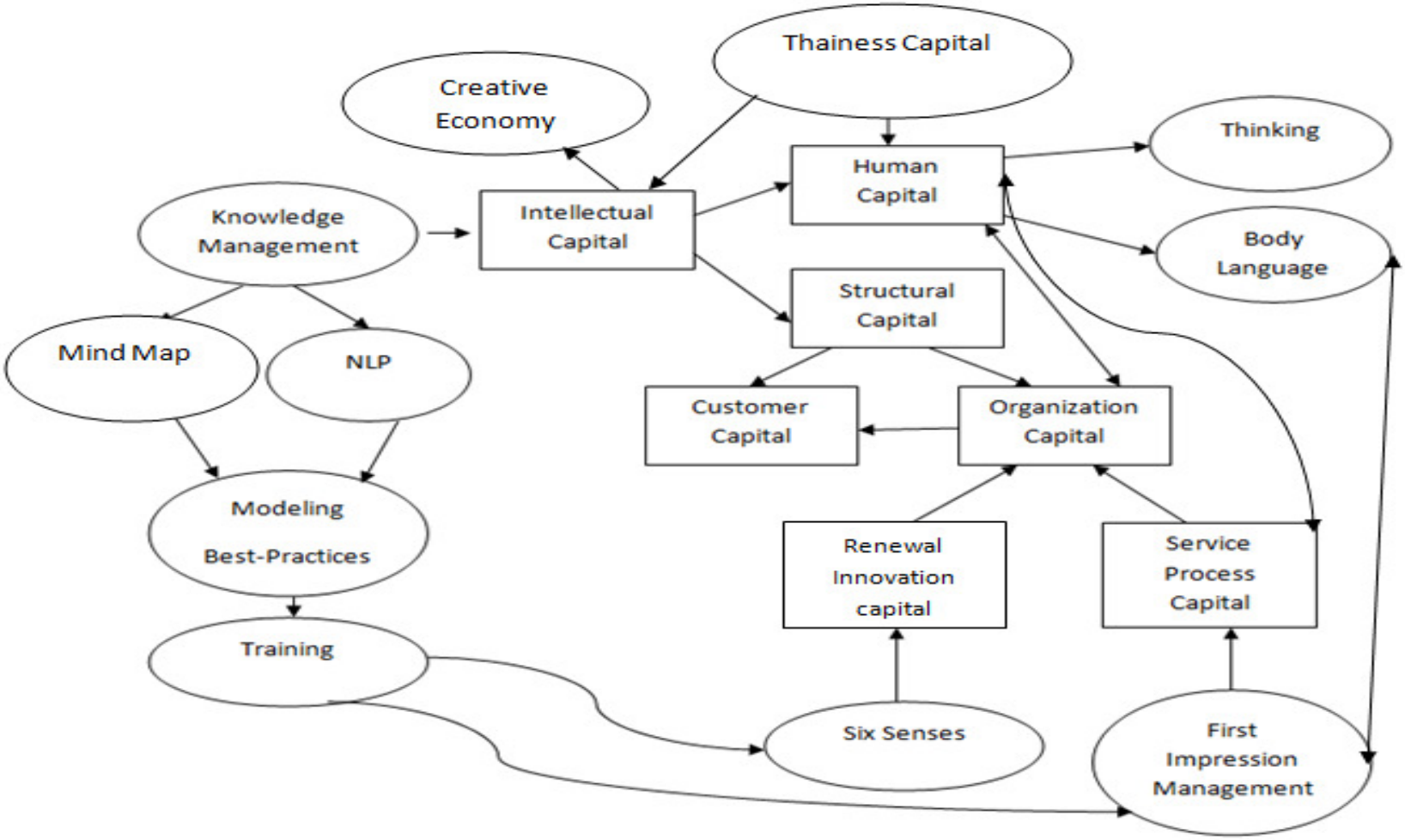
A series of photo images were used to trigger responses, where the respondents were asked to select the three images that they felt were the most representative of the Thainess service language. Respondents were then asked to indicate which primary, sensory-based impression was most relevant for generating Thainess service language: sight, hearing, taste, smell, touch or cognitive thought. The survey was then used to explore the extent to which Thainess intellectual capital contributes to conscious awareness of Thainess value co-creation. In order to determine how customer services define Thai cultural identity, Hofstede's (2001) definition of culture was applied. In selecting a symbolic representation of Thainess intellectual capital for first impression management, story-telling, heroes, symbols, logos, slogans and rituals with both a high symbolic value and being socially essential, from the customer's viewpoint, were considered. Experiential perceptions were evoked through sub-modality representation of both sensory and affective responses to service imagery, in other words, how the Thainess service language is represented through sight, hearing, taste, smell, touch and mind.

Thainess Serviceconomics Modeled

Thainess Serviceconomics was identified and modeled for intellectual capital value creation by exploiting Thainess capital (TC) in order to become a driving force for national competitiveness. Mind Map were then developed for effective knowledge representation, and Buzan's multiple intelligences were extended based on Thainess service innovation best practices.

Using service innovation as the creative metaphor, non-verbal communication was explored to create good first impression management in the Thai ways of doing things. The resultant knowledge management utilized "Thainess service innovation" as the intellectual

Figure 1. First Impressions, Intellectual Capital and Best Practices Mind map: Thainess Capital model



capital value creation model for the creative economy. Figure 1. illustrates the explanatory power of the Mind Map in knowledge creation from the implicit to the explicit levels, extended Skandia Model in respect to four conceptual areas: first-impressions, body language, intellectual capital, and best practices.

Results

Major Findings

Major Findings. The first research hypothesis was that organizational culture can support positive first impression management formations, such as the vision and mission of the organization, the reputation of the organization, and the organizational back story. This hypothesis was strongly supported by the results of the research. First of all, the creative economy of which these five organizations are part of is based on intangible intellectual capital, such as the unique cultural products and services described in the in-depth case study interviews of Chiva-Som Spa, Blue Elephant Restaurant, Mandarin Oriental Hotel, Jim Thompson Thai Silk, and Thai Airways International. This study found that world class, Thainess service language innovation could be used to make good first impressions, by using a new intellectual capital model that is based on a holistic approach. The new Thainess Capital is contained within the human brain, mind, and body, as well as having an emphasis on organizational capital – consisting of the logo, brand image, and the national capital – so we utilize the cultural capital of

beliefs and values. The traditional identity of Thais can be used to transfer impression management, leading to customer satisfaction. It was also found that Thai body language was described by many respondents as the primary way of giving a good first impression, by utilizing wais, smiles, and the saying of "*Sawaddi krub*" by men or "*Sawaddi kha*" by women, and by using a soft tone of voice.

It was the consensus of the respondents that Thai values, such as humility, submissiveness, kindness, attentiveness, thoughtfulness, courtesy, gentleness, and inventiveness, make Thais appear welcoming, and this becomes an important factor in managing first impressions. They also can create an acceptance and knowledge among international customers that Thais are impressively service minded. It was further found that first impression management consists of both the inner and outer persona of the person, in which the mind capital is intangible, but with tactile perceptions of feeling and touching. This mind capital is thought to be cultivated in Thais from a very young age, in their homes, temples, and schools. It was reported that this socialization process has helped them to create their individual beliefs, attitudes, and values.

If we knew how to use it, then we could create added value for not only the person, but also for organizations, society, and the nation at large. We could then leverage it as a first

impression service language, promoting the best practices to the rest of humanity for happiness creation.

Finally, this study found that Buzan's Mind mapping has proven to be a good cognitive tool, which can help to manage knowledge and train staff effectively.

Discussion and Applications

The creative economy is a paradigm shift that embraces economic, cultural, technological, and social aspects of development at both the macro- and micro-economic national levels. Thainess intellectual capital should be an innovative economic driver that can foster national "intellectual capital" development for national brand building, which will benefit the Thai economy in both the short term and long term. As a key economic multiplier, it should stimulate value creation in the knowledge-based service economy, which shows great potential for growth, through the continued development of the human talent and imagination of the Thai people.

Business Management System

The Thai business environment is considered to be an important factor affecting investment and developing businesses. The Thai community's condition is important, especially its culture and traditions. The business investor in the hospitality and service sectors needs to value the traditions and local culture of the community, to ensure their business functions

smoothly according to the community's culture, of which the religious beliefs and traditional life are very important. Consideration of human resources development is equal in importance if not more important than the production, management, and investment services. Investment aims for profit, but must consider the social uniqueness in return. Satisfaction comes not just from profit, but also development of the professional labor force, and the quality of development resulting from the Thainess mind.

The social system ensures that businesses in Thailand can have unique factors for their success. It was emphasized in the interviews that personnel development must encompass career planning and development as well as staff satisfaction. The HR responsibility exists not only at the management and operation levels, but in the employees' professional lives and minds, which need to be developed to share responsibilities together. The business sector gains profit, and is proud of their production and services. On the other hand, the staff members have a meaningful livelihood and share pride in the development and success of their employers, with a special emphasis on their Thai values and culture. So, the social system is involved in an ongoing education, and is helping to develop their lives to be both self-sufficient and peaceful. However, the consensus of the respondents was also that management needs to place more emphasis on international standards. It must be clear with standards, knowledge, new technologies, and due consideration of the satisfaction of international clientele.

Conclusions

It is believed that it is first necessary to set the specific priorities and determine the capabilities of staff, by placement in positions appropriate to their qualifications and personalities, and then provide a fair salary and other benefits, in order to motivate them to concentrate on and provide stability for their jobs. This also has an effect on their colleague's responsibilities and participation. Consideration of the organizational executive administration and operator sections' relationships at each level is based on their co-worker's mind values. These values will stress the importance of human resources development, which in turn is based on their minds, morals and self-discipline both top down and bottom up. This two-way relationship follows Buddhist principles, and they are the foundation of any Buddhist's mindset.

Business Sector Objectives

The most important goal for the business sector is increasing production and adding services to grow the business. This research has applied an investment model following the four standard essential factors for life: food, clothing, shelter and medicine as people's basic needs, for not only Thais, but all people throughout the world. Consideration was also given to the global capital investment standards, which are facilities, safety, speed of delivery, fairness, and a satisfactory level of service for that service or product.

Limitations

The findings of this study are based upon a limited number of interviews with key informants from only five world-class hospitality and service industry companies. They also all happen to be located in the Bangkok metropolitan area. These are all high performing companies, which serve as exemplars in their fields, and are the envy of their competitors. It would be imprudent at this point to generalize the results of the Mind map for Thainess capital outside of central Thailand, or to other related service industries.

These five companies also tend to service a high class, luxury clientele. It is unknown if these findings can be applied to other markets or market sectors. For example, would this model apply with equal success to the no-frills airlines such as Thai Air Asia, or non-Thai competitors such as Tiger Airlines? It is also interesting to note that Blue Elephant Restaurant is not alone, and has not created a unique market niche by branding the Thainess capital model in Bangkok, because many of their competitors follow similar practices. Finally, although the service excellence of these five companies was assumed because of their award winning standings, there has not been independent confirmation of their service excellence that could be assured through access to, for instance, customer satisfaction surveys.

Recommendations for Future Research

It would be important to see the findings of this study, and the Mind maps that have been developed, replicated in future studies of the hospitality and service industry in Thailand. It

would be interesting to see if the model applies to the middle range of the hospitality industry, or to other important sectors of the service industry in Thailand, such as the banking industry. It would also be interesting to see if the model applies throughout Thailand, such as in tourist destinations like Chiang Mai, Hua Hin, Pattaya, and Phuket.

Implications

It is important to emphasize the contribution that Thainess capital can make to the service industries, by creating more value as an innovation service language, supporting a better world and greater service happiness. The important concept is that culture can be used for generating intellectual capital, using Thai culture as the cultural base for future national competitiveness in the ASEAN Economic Community and the world. Combining all the six senses explored in the Mind mapping model and identified through the in-depth interviews, it is possible to think of Thai human capital as the "seventh sense." There will be a multiplier effect from using Thainess capital, because there are many ways that value can be added. These multipliers include: improvements in work satisfaction and quality of life, increased market share and competitiveness of Thai businesses, increased appeal to the uniqueness of Thailand in the global tourism sector, increased competence and confidence among service staff, and a better understanding and image of Thai culture which will translate into increased market image, penetration and market share for Thai exports.

The purpose, relevance, and implications of this study can therefore be applied beyond the traditional scope of marketing—as usually confined to specific service or product industry sectors—into other industries or disciplines where a greater understanding of IC, and application of its underlying principles, can make a significant contribution to economic capital (EC). Thus, Thainess capital can truly contribute to the Serviceconomics model that can serve as a future mode of production beyond that of the industrial era, help Thailand emerge from the middle-income nation trap, and create a world class service economy for Thailand.

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