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## AUTHORS

Shiaw Wu

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## An Exploratory Application of the Ken-OT Model to Different Knowledge Intensive Sectors in Taiwan

Shiaw Wu

### Abstract

This is an exploratory empirical research paper aiming to evaluate potential usefulness of a new model of organizational transformation called the Ken-OT model. This model uses the established strategic management concept of dynamic capabilities but describes the operations of these from the perspectives of *Tai-Chi* and *I-Ching*.

The Ken-OT model proposes a complex adaptive systems model (CAS). The system consists of two parts of a whole: One is based on the concept of Tai-Chi by adopting knowledge leverage as Yin and value creation as Yang. The second part is derived, by adopting the three aligning principles of the I-Ching logic – Yin/Yan, Wu-Hsing, and equilibrium, an organic combination relationship between dynamic capabilities is to be configured.

This research uses FAHP and DFA methodology to explore the configuration of dynamic capabilities and aligning principles across different services sectors. Then, four case studies in different sectors are used to interpret and induct the implications and operation of dynamic capabilities and aligning principle paradigms in creative organization transformation.

It is concluded that knowledge intensive service industries do appear to use an approach which can be described in terms of the alignment of dynamic capabilities. Further, it is argued that the philosophical logic inherent in the Ken-OT model provides a framework for thinking about and understanding the transformation processes required.

**Key words:** Dynamic capability alignment, I-Ching, Knowledge intensive services, Neo-Confucian, Organizational transformation.

### Introduction

Service providers are increasingly being recognized as important in developed economies (Kellerman, 2002). Within knowledge intensive services (KIS) industries, increasing demand for services means increasing the input of knowledge and/or renovated technology to win and retain satisfied customers. This means that organizations need to reconfigure capabilities and renew system interfaces. For individual companies, this transformation involves the change of production processes, input resources, and service models; so as to further change the business's activities as a whole.

Economic development issues in Taiwan include how to facilitate knowledge service supply, the stimulation of new demand and how to shorten the cycle time for organizational transformation within the industry. Wu (2004a) presented a model of organizational transformation which proposed that transformation was a creative evolutionary process. He called this the Ken-OT model (Figure 1). The model used the philosophies of *I-Ching* and *Tai-Chi* as the mechanisms for illustrating how the 'black box' of organizational transformation might operate. The model uses four dynamic capabilities – organizational learning capability, e-enterprise capability, knowledge innovation, and value migration – as the main perspectives of knowledge base organization. The model uses the logic of *I-Ching* as its basic principle to form an organizational transformation platform to interpret the processes of organizational creative evolution (Wu, 2004a).

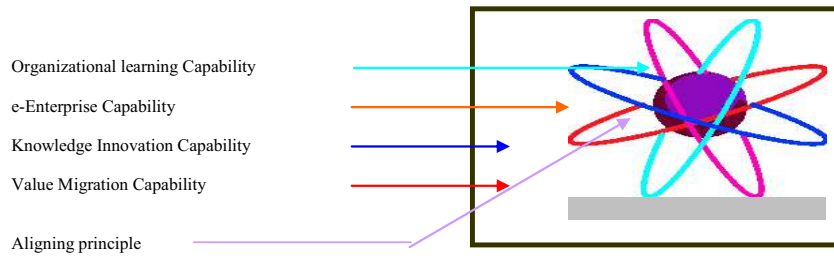


Fig. 1. Three dimensional representation of the Ken-OT Model

The types and components (sub-systems) of dynamic capabilities required for organization transformation in a knowledge-based economy were established from the literature by Wu (2004a) and are summarized in Table 1 below.

Table 1

Types and components of Dynamic Capabilities

Dynamic Capabilities	Components/ sub-systems
A. Organizational learning Capability	A1. Knowledge Acquisition, A2. Knowledge Distribution, A3. Knowledge Interpretation, A4. Organizational Memory
B. e-Enterprise Capability	B1. Information infrastructure, B2. Information operations structure, B3. Information value system
C. Knowledge Innovation Capability	C1. Knowledge Integration, C2. Innovation Mechanism
D. Value Migration Capability	D1. Value Conception, D2. Value Realization, D3. Value Delivery

The purpose of organizational transformation is to create organizational value and to maximize it (Prahalad & Hamel, 1994). The internal mechanisms of organizational transformation are based on the improvement or upgrading of an organization’s dynamic capabilities. However, only general notions of operation of this process exist. For instance, Teece (1998) suggests that different forms of knowledge and capability will influence organizational features and operational performance while Teece, Pisano, Shuen, (1997) describe dynamic capabilities as being composed of external sensing and organizational action. Such descriptions are too generic to be of practical use.

Table 2

The operational meaning of aligning principles

	Aligning principles	Emblem	Operational meaning
1	The creational principle in the <b>Yin/Yang view</b>	X	This Yin/Yang is a bi-directional cause and effect operational definition.
2	The transforming principle in the <b>Wu-Hsing view</b>	Y	This Wu-Hsing is an operational definition of unidirectional causality that includes creation and destruction.
3	The harmonious principle in the <b>equilibrium view</b>	Z	This equilibrium is an operational definition of reaching equilibrium between effectiveness and collaboration.

This paper continues the work of Wu (2004b) where he used data from a cross-sector of KIS organizations to undertake a series of analyses that support the general nature of the Ken-OT model. More specifically, Wu (2004b), used FAHP and quantitative multivariate statistical analysis to propose that the construction of the Ken-OT model and the application of the three alignment principles (Table 2) are a useful explanatory system for organizational transformation in KIS industries. Hence the goal in this paper was to explore how the dynamic capabilities in different

KIS sectors are actually configured, and to complement the quantitative data already collected through the use of qualitative methods. Below there is a one dimensional representation of the Ken-OT model (Figure 2).

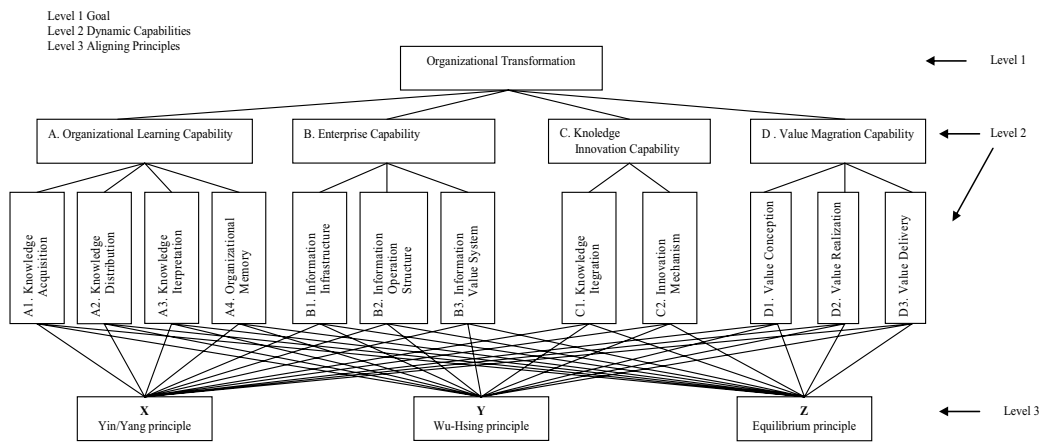


Fig. 2. The Ken-OT model detail scheme

**Methods**

The KIS organizations that formed the sample for this research were divided into four broad categories. These categories were described earlier in this portfolio in Wu (2004b) and are briefly described in Table 3 below.

Table 3

Four categories of KIS sectors and the types of companies

KIS Sectors	Description of the types of companies
Traditional Professional services	Including accounting firms, assurance service, marketing, advertising, lawyers, consultancies and etc.
R&D service	Including research support services, intellectual property services, venture capital, industrial design and professional testing companies, etc.
Technical services	Including SCM services, automation services, global logistic services, design house , professional testing and eCommerce, etc.
Financial services	Including banking, insurance companies, stock houses and security firms, etc.

This paper will first report on further analysis of the data used in the previous paper and for this reason the collection procedures are not repeated here but can be found in paper 2 of this portfolio, i.e. Wu (2004b). As well, this paper includes individual organizational case studies based on questionnaire data and interviews.

For the KIS sector analyses, FAHP was used to generate the individual KIS industry data (Wu, 2004b). This was followed by the application of Canonical Correlations and Discriminate Functional Analyses (DFA) using SPSS11.5 to produce configurations of the aligning principles with the dynamic capabilities. In the DFA analysis, discriminant equations were constructed to provide an eigenvalue which is the ‘score’ of the discriminant equation. The intent was to determine whether the KIS sector groups shown in Table 3 could be distinguished on the basis of their configurations.

The case analyses that were conducted were designed to enhance the explanatory power of the quantitative analyses already conducted. Interviewees for the case studies were selected on the basis that they claimed to have achieved a successful organisational transformation and were recognized as model organisations within their KIS sectors. Interviewees were either the CEO/COO or the person responsible for strategic planning and management. The interviews were semi-structured in style and enquired into the character of the organisational transformation process and the issues that surrounded the transformation over the last three years. Two interviews were conducted per company. The interview data were analyzed by comparing the internal and external data with the phenomena of the organizational transformation and then attempting to deduce an understanding of the configuration of the dynamic capabilities. The companies selected included: (1) an integrated marketing communications company (traditional professional services); (2) an R&D institution (research and development services); (3) an I.C. design company (technical services); and (4) an E-Bank (financial services).

### The results of quantitative analysis

Discriminant function analysis (DFA) is used to determine which variables discriminate between two or more naturally occurring groups. This research used the discriminate variables to discriminate different dynamic capabilities and groups of aligning principles. These groups of alignment principles are the configurations that are strategically important for guiding the organization towards an alignment of the dynamic capabilities with different principles. The configuration strategy of the dynamic capabilities alignment by sectors is shown in Table 5. The larger the standardized coefficient is, the larger is the respective variable's unique contribution to the discrimination specified by the respective discriminant function. A canonical correlation analysis can determine successive functions and canonical roots. In this research, only the first function has been selected, because it has the highest explanatory power (i.e. high percentage correctly classified).

Table 5

The configuration strategy of the dynamic capabilities alignment by sectors

Respective KIS sectors	DFA classified	The configuration of dynamic capabilities alignment
Traditional prof. services	95.2% correct	Z: A2,A1; Y: C2; X: A4.
R&D services	93.1% correct	Z: C1
Technical services	77.4% correct	Z: A1; Y: D1,A2;
Financial services	71.1% correct	Z: C2,B1,B2; X: C1.

Different configurations of dynamic capabilities will have different relations to the success of organizational transformation. A positive relation indicates that the dynamic capability is the core capability that will support the success of organizational transformation. That is to say, it creates new value for the organization. For the sectors of technical services and financial services, the importance of different dynamic capabilities related significantly to the success of organizational transformation, but for other two industries, the relation is insignificant.

### A discussion based on rules of I-Ching thinking

The operational application of these ideas to organizational transformation is manifested through the functioning of interrelationships between respective dynamic capabilities in order to construct a systematic model.

The case analysis in this paper follows the rules of interpretation already established in the model described earlier in this portfolio (Wu, 2004a). Table 6 shows how *I-Ching's* philosophical logic was applied to interpret the application of the dynamic capabilities' alignment principles by rules (Chang, 2002; Chang 1990).

Table 6

## Summary of interpretation required rules

Aligning Principle	Rule A	Rule B	Rule C	Rule D
By X Principle	V	V		
By Y Principle	V		V	
By Z Principle	V	V		V

**Rule A:** Based on the capabilities construction rule mentioned in Wu (2004a), the dynamic capabilities were mapped into the corresponding categories of eight-trigram as shown in Table 7.

Table 7

## Dynamic capabilities mapped into eight-trigram

	Dynamic capability		System components	Eight- trigram	Wu- Hsing
1	Value migration (1.1)	Yang (1)	Value Conception (D1), Value Delivery (D3)	(1,1,1)	Metal
2		Yin (0)	Value Realization (D2)	(0,1,1)	Metal
3	e-Enterprise (0.1)	Yang (1)	Information Value System (B3)	(1,0,1)	Fire
4		Yin (0)	Information Infrastructure (B1) Information Operations Structure (B2)	(0,0,1)	Wood
5	Knowledge innovation (1.0)	Yang (1)	Innovation Mechanism (C2)	(1,1,0)	Wood
6		Yin (0)	Knowledge Integration (C1)	(0,1,0)	Water
7	Organizational learning (0.0)	Yang (1)	Organizational Memory (A4) , Knowledge Acquisition (A1)	(1,0,0)	Earth
8		Yin (0)	Knowledge Distribution (A2) , Knowledge Interpretation (A3)	(0,0,0)	Earth

**Rule B:** Based on the operational definition of Yin/Yang principles to separate the eight-trigram into four pairs of Yin/Yang and then describe their management implications (Figure 3, Table 8).

The operational nature of Yin/Yang is a kind of bi-directional cause and effect relationship between movement and tranquility. The movement and tranquility represent the relation of change from quantity to quality (Chou, 1017-1073).

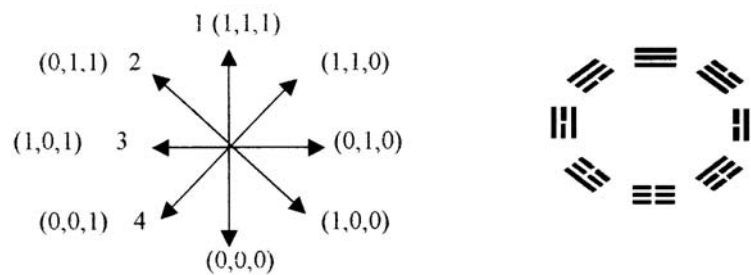


Fig. 3. Eight-trigram

Table 8

The corresponding characters of eight-trigram and their implication of management

Pair	Eight-trigram	Corresponding Characters	Implication of management
1	(1,1,1) (0,0,0)	Essence: Function	Essence means substantial and innate character. Function means operation or activity. Tranquility is essence. Movement is function.
2	(0,1,1) (1,0,0)	Subjective: Objective	Subjective means the organizational dynamic capability of subjective conditions. Objective means the objective competitive environment that is being faced.
3	(1,0,1) (0,1,0)	Knowing : Action	Knowing is not an objective understanding, but an axiology of self-recognition. Action is not a normal activity, but an execution of self-realization.
4	(0,0,1) (1,1,0)	Externalization: Internalization:	Internalization (tacit/1,1,0) and externalization (explicit/ 0,0,1) of knowledge are not exclusive independent processes but interactive, complementary processes. This corresponding process is knowledge conversion and this corresponds to the description of the SECI model (Nonaka, 1994).

**Rule C:** Based on the corresponding relationship of eight-trigram and Wu-Hsing, the following table shows the mapping of eight kinds of dynamic capabilities into Wu-Hsing's attribution (Table 9).

Table 9

The relationship of the eight-trigram and Wu-Hsing

Agent	Mapped eight-trigram		Corresponding capabilities of mapped eight-trigram	
Wood	(0,0,1)	(1,1,0)	Information infrastructure (B1) Information operations structure (B2)	Innovation Mechanism (C2)
Fire	(1,0,1)		Information value system (B3)	
Earth	(1,0,0)	(0,0,0)	Knowledge Acquisition (A1) Organizational Memory (A4)	Knowledge Distribution (A2) Knowledge Interpretation (A3)
Metal	(1,1,1)	(0,1,1)	Value Conception (D1) V Value Delivery (D3)	Value Realization (D2)
Water	(0,1,0)		Knowledge Integration (C1)	

Wu-Hsing's operational definition is the transformation of the co-existence of creation and destruction (Lin, Tsai, Chen & Chang, 2003). The complicated relationships of Wu-Hsing reflect the intricate and ever-changing creative process of the actual world. Table 10 and Figure 4 below are provided to help illustrate the management implications of cause and effect relationships emerging in the cause and effect chain.

Table 10

Managerial perspective of Wu-Hsing

Agent	Abbreviation	Character	Managerial perspective
Wood	Wd.	Creates (gives vitality)	Perspective of customer value proposition
Fire	Fi.	Grow (change)	Perspective of financial
Earth	Ea.	Conceives (Gestation)	Perspective of vision and mission
Metal	Me.	Condense (change accordingly)	Perspective of learning and growing
Water	Wa.	Nurse (hide)	Perspective of key process

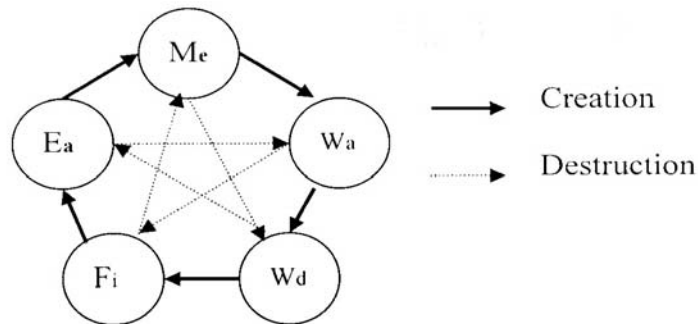


Fig. 4. Wu-Hsing (Five Agent)

**Rule D:** Based on the operational definition of equilibrium, the following figure is drawn to illustrate its management implication (Figure 5).

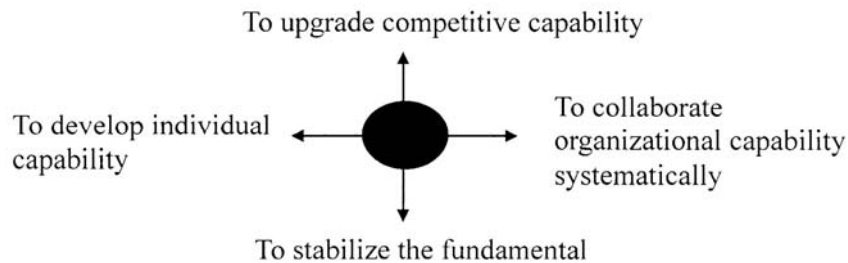


Fig. 5. Reaching equilibrium principle

The operational definition of equilibrium means dynamic equilibrium. The thinking of dynamic equilibrium in management is to maintain a certain degree of chaos in order to achieve the goal of harmony. Harmony refers to the achievement of equilibrium between effectiveness and collaboration and to pursue a synergy throughout the entire organization.

This system conforms with Einstein's notion that real theory must possess simplicity in its logic (Einstein and Seeling, 1988). Usually, quantitative method uses simultaneous equations to explain complicated cause and effect relationships. By this method, the meaning of a respective equation is very obvious. But the value of endogenous variables can not be decided by individual equations, it must be decided by a simultaneous system (Johnston, 1972; Kmenta, 1971).

In summary, the Ken-OT model seemed to be workable. It used the thinking logic of Yin/Yan, Wu-Hsing, equilibrium and Tai-Chi to construct its symbolic logic on the basis of the data provided by respondents. The interpretation rules converted the *I-Ching's* philosophical logic to sense making managerial tool which might be developed to guide the organizational transformation processes.

## Case Studies

The responses of individual case organizations from the different KIS sectors are analysed on the basis of statistical confirmation of dynamic capabilities and their alignment as interpreted in Table 6.



### 1. Traditional professional services: an integrated marketing communication (IMC)

The case company was one of the top six global advertising agencies with global annual revenue over USD 6 billion. The Taiwanese branch was established 20 years ago and is regarded as the most professional IMC in Taiwan. Their business scope includes: advertising, direct marketing, interactive marketing, public relations, CIS, promotion & events, and telemarketing. The following are the critical success factors that IMC defined at the beginning of the organizational transformation: the control of the integrated process of cross functions, the diversity of customers, sufficient and effective application of IT (McGoon, 1999).

The chairman expressed the vision as “To be the agency most valued” and noted their core value is in human, knowledge and creative capability. He suggested that the continuing growth of the company would be based upon their ability to “enhance employees’ training, to organize knowledge systematically, and to build a corporate culture and environment that can invigorate creativity.” Senior management in the firm put a lot of effort into building a knowledge management capability and constructing an open climate within the organization so that the organization could embrace new ideas and knowledge.

The DFA analyses for this organisation provided an Eigenvalue of 30.969 which represents 95.2% of variance. This is significant (Wilks’ lambda  $p < 0.008$ ).

Table 11

Structure Matrix of function 1 (Traditional professional services)

	A2Z	C2Y	A1Z	A2Y	D3X	A4X	A4Z	D1Y	B2Z
Loading Value	.104*	.057*	.042*	-.036	-.030	.023*	.009	-.008	.002

On the basis of Table 5 and Table 11, for traditional professional services and the IMC case, its configurations of dynamic capabilities alignment are:

1. To adopt the equilibrium principle (Z) to align the application of the capabilities of knowledge acquisition (A1) and knowledge distribution (A2),
2. To adopt the Yin/Yang principle (X) to align the application of the capability of organizational memory (A4).
3. To adopt the Wu-Hsing principle (Y) to align the application of capability of Innovation mechanism (C2).

The implications of these configurations are elaborated below:

**Configuration 1: The principle of equilibrium (Z) to align the capabilities of Knowledge Acquisition (A2) and Knowledge Distribution (A1).**

#### <Step 1> Mapping and Interpretation

From Table 6 and Table 7, the symbol of knowledge distribution (A2) is (0.0.0.) and from Figure 3, pair 1 and Table 8, (0.0.0.)’s corresponding opposite is (1.1.1.)-value conception (D1) and value delivery (D3). This means that knowledge distribution (A2) is the function. The capabilities of value conception (D1) and value delivery (D3) formed by its creative service ideas are the essence.

From Table 6 and Table 7, the symbol of knowledge acquisition (A1) is (1.0.0.) and from Figure 3, pair 2 and Table 8, (1.0.0.)’s corresponding opposite is (0.1.1.) -value realization (D2). This means that knowledge acquisition (A1) is explicit objective matter and that the implicit knowledge of the company, the value realization (D2), is its subjective purpose.

#### <Step 2> Character of alignment principle and implication

The transformation of traditional professional service is based on its existing knowledge acquisition (A1) and knowledge distribution (A2) to look for new creative service ideas. Since the operation of IMC emphasized an outside-in oriented process, it had the goal of integrated harmony. This equilibrium principle is a harmonizer for the vertical axis of value migration and horizontal axis of knowledge acquisition & knowledge distribution.

**Configuration 2: The principle of Yin/Yang (X) to align the capability of organizational memory (A4).**

*<Step 1> Mapping and Interpretation*

From Table 6 and Table 7, the symbol for organizational memory (A4) is (1.0.0.), and from Figure, 3 pair 2 and Table 8, its corresponding opposite is (0.1.1.) -value realization (D2). Therefore, the purpose of the organizational memory capability (A4) was to build up systematic storage of knowledge in order to accumulate knowledge effectively.

*<Step 2> Character of alignment principle and implication*

This creational principle in the Yin/Yang view is characterized by a bi-directional cause and effect. The translation of the concept into management practice also has two sides (Table 8). Organizational memory (A4) means the existence of objective matter. That is, the organization codifies its processes, knowledge, and intelligence into document or computer based form. Its subjective meaning is to transfer the organizational memory into intellectual property of business value. From the perspective of an advertising agency, the creative process and its results are equally important. This case company had built up its own localized knowledge bank (known as the marmot plan) to support the knowledge bank structure of its headquarters. Organizational memory was then transformed into creative ideas and production capability to become the major company capability.

**Configuration 3: The principle of Wu-Hsing(Y) to align the capability of innovation mechanism (C2).**

*<Step 1> Mapping and Interpretation*

From Table 6 and Table 7, the symbol for innovation mechanism (C2) is (1.1.0.), and from Table 3, its representational character is wood.

*<Step 2> Character of alignment principle and implication*

The operational definition of Wu-Hsing emphasizes a unidirectional cause-and-effect relationship. From the cause and effect relationship of Wu-Hsing, wood could be traced back from water, and then metal, and then earth (see Figure 4). In Table 9, Earth represents the organizational learning capability; metal represents the value migration capability and water – knowledge integration. This is just the situation that occurs after organizational learning capability is well developed; internal and external knowledge can be integrated to create an organizational intellectual capability (Nonaka & Takeuchi, 1995). In knowledge management, the case organization emphasized the exploration and accumulation of knowledge as a first step. So the case company's process of development and configuration of dynamic capabilities in organizational transformation is in logical accordance with the proposed Ken-OT model.

**2. Research and development services: Case of an R&D institution**

This case organization was a not-for-profit R&D institution engaging in applied research and technical services. It was founded over 30 years ago by government to fulfill the technological requirements of industrial development. By the year 2001, it had grown to become an organisation of 6000 people, and serves as the technical center for industry and an unofficial arm of the government's industrial policies. The core capabilities of this organization are creativity, knowledge, superior human resources and intellectual property rights. The strategic goals of the organization are:

1. To transform from the role of technical provider to an integrated manufacturer and a service provider in related fields.
2. To establish the capability to step into new high-tech industries.
3. To maintain the driving force for sustainable growth.

In line with these goals the organization has undertaken a series of transformative processes as follows:

1. Restructuring: the organization established several new organizations including a Biomedical Engineering Center, SOC and Nano Center. Further restructuring involved setting-up a shared services center, and the building of a professional services

center which included a Technology Transfer & Service Center and an Industrial Economic & Knowledge Center.

2. Process Reengineering: The case organization started from eight supportive processes and expanded them to fifteen processes.
3. Launching pilot programs for Knowledge Management: Six pilot programs, four of which were technology-related and the rest were management-related.
4. IT migration & ERP implementation: Leveraging new IT enabling capabilities which included: IT migration, e-process and the implementation of ERP.

From the DFA an Eigenvalue of 53.105 representing 93.1% of variance in the data set ( $p < 0.051$ , Wilks' lambda) was calculated.

Table 12

Structure Matrix of function 1 (R&amp;D services)

	C1Z	C2Y	C2Z	A2Z	B2Y	B2Z	A1X	A3Y	D3X	D1Y
Loading Value	.505*	-.442	-.353	-.336	-.276	-.177	.015	-.015	.013	-.123

From Table 5 and Table 12, for R&D services, the major configuration is to *adopt the equilibrium principle (Z) to align the capability of knowledge integration (C1)*. This is further elaborated below.

**Configuration 1: The principle of equilibrium (Z) to align the capability of knowledge integration (C1).**

*<Step 1> Mapping and Interpretation*

From Table 4 and Table 7, the symbol for knowledge integration (C1) is (0.1.0.) and from Figure 3, pair 3, its corresponding one is (1.0.1.)- information value system (B3). The correspondence of (0.1.0.) and (1.0.1.) represents the relationship of knowing and acting. The interpreted meaning of the above is to upgrade the knowledge integration to a self-cognitive level so as to achieve the goal of self-realization. Throughout this process, the equilibrium principle must be maintained.

*<Step 2> Character of alignment principle and implication*

The equilibrium principle is a harmonizer for the vertical axis of efficiency and horizontal axis of knowledge acquisition & knowledge distribution (see Figure 5). That is, the integrated equilibrium of synergistic tasks in different technology fields and research performance is what the R&D institution pursues. Therefore, the case organization started with a re-engineering of three core processes and the implementation of an ERP system as their backbone platform for knowledge integration. It took the case company 2 years to integrate technologies and to set up an IT system platform. The approach undertaken is consistent with the reported configuration of dynamic capabilities as proposed by Ken-OT model.

**3. Technical service: Case of an I.C. design company**

The case company has been established for 12 years. Their main business was to develop core logic chips, providing design and sales (except manufacturing). Over time, the organisation has also moved into the fields of communications, computer peripherals and consumer products (3C). The case company's revenue depends mainly on their own design or ODM to develop products and services. Their most competitive weapon is 'time to market'. Interview participants from the case company considered that in order to face their rapidly growing and fickle market, adaptive technical creation and marketing strategies were critical. These strategies included:

- 1) Expanding market penetration,
- 2) Expediting their span of product lines,
- 3) Expanding sales turnover by M&A and joint venture.

All in all, the case companies considered that to have global competitive capability, they must produce the killer applications which will bring in revenue to 1 billion USD annually to attract talented employees, and always focus on specialist markets.

Therefore, only through the knowledge transformation, conversion or sharing, the organization could obtain greater value (Nonaka & Takeuchi, 1995; Haldin-Herrgard, 2000). This concept corresponds with the I-Ching's philosophic concept of knowledge theory (Lin, 2002; Wu, 2004a). The result of aligning dynamic capability may formally create a strategic asset of the inimitability, durability, heterogeneity, and superiority for the organization (Amit & Schoemaker, 1993; Collis, 1995; Peteraf, 1993).

DFA for this case study provided an Eigenvalue of 11.731 representing 77.4% of variance ( $p < 0.005$ , Wilks' lambda).

Table 13

Structure Matrix of function 1 (Technical service)

	A1Z	A3X	D1Y	D2X	A2Y	B1Z	D1X	C2Y
Loading Value	.552*	-.333	.223*	-.202	.162*	-.143	-.019	-.005

Referring to Table 5 and Table 13, for technical services, it can be seen that the case company has the following two configurations:

1. To adopt the equilibrium principle (Z) to align the application of the capabilities of knowledge acquisition (A1), and
2. To adopt the Wu-Hsing principle (Y) to align the application of capability of *value conception* (D1) and *knowledge distribution* (A2). The import of each of these configurations is elaborated below.

**Configuration 1: The principle of equilibrium (Z) to align the capability of knowledge acquisition (A1).**

*<Step 1> Mapping and Interpretation*

From Table 6 and Table 7, the symbol for knowledge acquisition (A1) is (1.0.0.) and from Figure 3, pair 2 and Table 9, its corresponding one is (0.1.1.) - value realization (D2).

*<Step 2> Character of alignment principle and implication*

The operational definition of equilibrium is to look for balance in efficiency and collaboration in cross functions. Top management of the case company created an incentive mechanism to encourage employees to develop a faster time-to-market ability. Within a few years, the case company's outstanding growth will become one of the world's top 5 IC design company (Lu, 2002). Because the efficiency in carrying out the value realization is very successful, the case company also devotes a lot of effort to improve its knowledge acquisition across department/SBU. This search for equilibrium can be seen in the organizational behaviors of setting up a documentation center and through the internal book club to enhance the corporate culture and therefore the interpretation offered by the application of the model makes sense in reality.

**Configuration 2: The principle of Wu-Hsing (Y) to align the capabilities of value conception (D1) and knowledge distribution (A2).**

*<Step 1> Mapping and Interpretation*

According to Tables 6, 7, 8, 9, the attribution of value conception (D1) and knowledge distribution (A2) in Wu-Hsing are metal and earth. In this case, a hidden cause-and-effect chain in Wu-Hsing exists. Therefore, regarding the relationship of metal and earth in Wu-Hsing, the hidden ones are water, wood, and fire (Table 9, Figure 4). Fire in Wu Hsing represents the information value system (B3), wood represents information infrastructure (B1), information operations structure (B2) and innovation mechanism (C2), and water represents knowledge integration (C1) (Table 9). The case organization is gradually spreading out its global research and development layout, and this is another example of capability alignment.

<Step 2> *Character of alignment principle and implication*

For an IC design firm, knowledge acquisition and information infrastructure could construct its basic platform of knowledge management. In this case company, because of the different attribution of IC design for southern and northern bridges, they must divide their IC design into different groups. But those groups still need to be integrated together. Therefore, the development sequence of the capabilities provides them with a guiding roadmap that enables the discovery of hidden capabilities. This proves again that the configuration of dynamic capabilities and their alignment in the Ken-OT model is in accordance with this industry's character.

**4. Financial services: Case of E-Bank**

In Taiwan, the mainstream of the financial services industry is local banks that represent 75% of the total assets of the whole industry. There are over 50 local banks and the average service population for one branch is less than 5000, an overbanking situation. The interest rate is continuously going down and the risk of Non-Performing Loans (NPL) is increasing, all these forces push the banks towards transformation.

The case bank had been established for over 35 years. Generally, the following factors must be taken care of by management: capital adequacy, asset quality, management, earnings, liquidity, and sensitivity to market risk. However, the case banks consider that e-banking is their strategic weapon. As such they have undertaken some major initiatives in recent years. These initiatives include:

- 1) The provision of a range of new products and services;
- 2) The establishment of an e-platform;
- 3) Extending their business scope globally;
- 4) Improvements to the efficiency of their operations.

The case banks use their IT platform for automation of services, e-banking, Internet banking, B2C payment systems and an Internet-based trading center to provide an e-service for all aspects of their customer's needs. They also implemented a Computer & Telecom Integration (CTI) to provide integration services and reinforce their interactive relationships with customers. Through rapid response to customers' requirements, the bank has narrowed the gap between customers' expectations and satisfaction levels, thereby building customer loyalty to the bank. In addition, the most direct impact of e-banking is to cost savings in transactions and operational costs and improving the management efficiency.

After continual and determined development, the case bank has not only achieved its organizational transformation objective, but has been recognized as the best regional bank of the year by foreign financial magazines on multiple occasions. The bank's profitability is far ahead of its competitors.

The DFA provided an Eigenvalue of 37.429 representing 71.1% of the variance ( $p < 0.016$ , Wilks' lambda).

Table 14

Structure Matrix of function 1 (Financial services)

	C2Z	B1Z	C2Y	B3Y	C1X	A4X	B2Z	D3Y	A1Z
Loading Value	.198*	.161*	-.095	-.072	.066*	-.062	.054*	.047	.004

Referring to Table 5 and Table 14, for financial services, it can be seen that the case bank has followed two configurations:

1. To adopt the equilibrium principle (Z) to align the application of the capabilities of innovation mechanism (C2), information infrastructure (B1), and information operations structure (B2).
2. To adopt the Yin/Yang principle (X) to align the application of the knowledge integration capability (C1). Refer to Table 4 for the verification and illustration (*DFA correctly classified is 71.1%*) of the configurations are elaborated below.

**Configuration 1: The principle of equilibrium (Z) to align the capabilities of knowledge innovation (C2), Information infrastructure (B1) and Information operations structure (B2).**

*<Step 1> Mapping and Interpretation*

From Tables 6 and 7, the symbol for innovation mechanism (C2) is (1.1.0.) and from Figure 3, pair 4 and Table 8, its corresponding opposite is (0.0.1.) Information infrastructure (B1), Information operations structure (B2). Therefore, innovation mechanism (C2) is tacit and information infrastructure (B1) and information operations structure (B2) are explicit.

*<Step 2> Character of alignment principle and implication*

The operational definition of equilibrium is a dynamic equilibrium. It is important to develop creative capabilities while maintaining efficiencies. The bank developed its e-platform as a strategic weapon. Based on this strategy, the bank enhanced its knowledge innovation capability (C2) by installing an ERP/CRM to build its integrated information platform, expand its service automation and Internet banking service. In the past 3 years, their expenditure on information infrastructure (B1) – B2C Internet trading center, data mart, and information operations structure (B2) – database marketing and data miner, has been two to three times that of their competitors. They are, therefore, the paragon of electronic banking in Taiwan.

**Configuration 2: The principle of Yin/Yang (X) aligned to the capability of knowledge integration (C1).**

*<Step 1> Mapping and Interpretation*

From Tables 6 and 7, the symbol of knowledge integration (C1) is (0.1.0.) and from Figure 3, pair 3 and Table 8, its corresponding opposite is (1.0.1.) - information value system (B3).

*<Step 2> Character of alignment principle and implication*

The operational definition of Yin/Yang principle is movement and tranquillity, which is characterized by an ongoing creative evolution. The management implication of this relationship to Yin/Yang is the match of knowing and action. This explains why after the integration of internal knowledge, the case bank changed and reorganized the processes of its information. This is synonymous with the development of knowledge utilization. The goal of their effort is to further develop the relationship between bank and customer. This will in time change its business model (Wu, 2004a).

## Discussion

For traditional professional services, organisational transformation is the reinvention and the creation of new service concepts, especially for services enabled by new technologies. Successful service businesses such as: Starbucks, Citibank, or Wal-mart, are all continuously developing the possibilities of new knowledge/technologies to apply in their service system. Most of that new and valuable knowledge in the organization becomes a kind of embedded knowledge (Bedoracco, 1991). The case companies confirmed that through knowledge sharing and the construction of knowledge systems, embedded knowledge can be changed to be migratory knowledge (Dyer & Singh, 1998; Kale et al., 2000).

For R&D services, a core activity of organisational transformation is an emphasis on systematic technical knowledge (Black & Boal, 1994) within the organisation. This means that through the implicit process of knowledge integration, the organization can develop their knowledge energy and create an intellectual barrier to entry that is not easy to copy. The more complicated the technical knowledge is, the more crucial the integrated action is (Leonard-Barton, 1995). This observation corresponds with the principle of harmony that emphasizes the participation of the organisations's people.

For technical services, the implication of organisational transformation is the innovation of knowledge. These types of knowledge intensive organizations possess the following characteristics: knowledge creation systems, networked organization (virtual organization), creative atmospheres and organizational learning. Organizational transformation in technical services corre-

sponds to the learning model of “sense, interpret, decide and act” (Haeckel & Nolan, 1993). It is also akin to Leonard-Barton’s (1992) notion that the value of learning is realized as an internal process through problem solving, integrated activity between technology and people, the business culture and carefully selected knowledge types.

For financial services, the implication of organizational transformation is that it emphasizes activity based on knowledge and information technology. It focuses on the transformation of data to information and then to knowledge through the process of comparison, consequence, connection and conversation (Davenport & Prusak, 1998). Furthermore, information technology can bring more creative opportunities for the organization, including relocation of organizational resources, reengineering operation process, reduction of cycle times and improvements in work quality. Information technology can create new services and business scope (Davenport, 1993).

Based on the knowledge theory under I-Ching philosophy, knowledge would be treated as yin, and value would be treated as yang (Wu, 2004a). The concept of knowledge is being induced from Herderson and Kim (1990) and being classified into reinforcement and creation. The concept of value is being induced from Schumann (1994) and being classified into changelessness and creation. Therefore, these two classifications will construct a 2x2 matrix which could interpret the character of four kinds of organizational transformation by KIS sectors (Table 15).

Table 15

Organizational Transformation Type		
	Knowledge reinforcement	Knowledge creation
Value changelessness	incremental innovation	distinctive innovation
Value creation	architectural innovation	breakthrough innovation

In summary, the following might be concluded:

1. The organisational transformation of financial services sector is a kind of incremental innovation.
2. The organisational transformation of traditional professional service sector is a kind of architectural innovation.
3. The organisational transformation of technical service sector is a kind of distinctive innovation.
4. The organisational transformation of research and development services sector is a kind of breakthrough innovation.

There are different strategic implications for organizational transformation when adopting different alignment principles for the configuration of dynamic capabilities. This conclusion corresponds with many scholars’ research findings (Helleloid & Simonin, 1994; Nonaka, 1995; Bartlette & Ghoshal, 1997). The Ken-OT model applied *I-Ching’s* philosophic logic to the alignment of organizational capabilities and concluded that the dynamic capabilities can convert to be the energy of the organization only if they have the dynamic conversion procedures of obtaining, accumulating, transferring, integrating, relocating, and recreating

### Research limitations

This research provides a systematic approach to verifying the Ken-OT model for different KIS sectors. It can not, however, provide conclusions on the effects toward an individual firm under the ecological change of the industry. In fact, a comprehensive research study should be undertaken that involves organizational environmental factors to a larger degree. Such a focus exceeded the scope of the current research. Further, the portion of negative loading values in the structure matrix has not been discussed yet as those values may have a negative influence or they may have no meanings at all.

### Suggestion for future research

Based on this exploratory research, it appears possible to further develop a measuring indicator for KIS business according to their different types of dynamic capabilities as the measuring system for management performance and/or economic value.

The *I-Ching's* philosophical logic provides the principles. The principles themselves are the regularities. The principle is objective, it is not human-created, but is actively recognized and used by humans. The principles are meaningful only when their function can be concretely accomplished. This research is only an exploration of *I-Ching's* potential application in the management field. There is still considerable research remaining to be done to lead to practical application

### Conclusions

From the above four empirical case studies, the organizational transformation in different KIS sectors could be understood through the Ken-OT model. It is sometimes even more vivid and more apt in qualitative analysis than in quantitative analysis (Lin, 2003). This collective system forms the change logic of a Neo-Confucian System and provides a set of integrated and easy to master principles to assist organizations which face complex organizational transformation (Lin, 1995). The system wisdom induced by *I-Ching* logic not only provides an internally consistent solution to solve the complicated issues of organizational transformation, but also allows organizational transformation to form a creative evolutionary complex adaptive system through the learning and changing of organizational capabilities in the process of the interactive function of organization and environment.

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