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A Study of the Correlation between Knowledge Management Activities and Operational Performance in Taiwan Hospitals

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Abstract: This study treated the hospitals as subjects and probed into the correlation among market orientation, organizational learning, types of operational strategies, organizational culture, executive degree of knowledge management activities and operational performance. The samples were 466 qualified hospitals in hospital evaluation and teaching hospital evaluation from 2007 to 2011 registered in Department of Health, Taiwan. The researcher collected related data by distributing questionnaires through mails. The subjects were the supervisors in the hospitals. The results found that the higher executive degree of knowledge management was, the more significant and positive effect it would be on operational performance; the higher the executive degrees of cost leadership, marketing differentiation and innovation differentiation strategy were, the more significant and positive effect it would be on executive degree of knowledge management; the higher the executive degrees of organizational learning and market orientation were, the more significant and positive effect it would be on executive degree of knowledge management; the higher the executive degrees of rational culture, hierarchical culture, group culture and developmental culture were, the more the effect it would be on executive degree of knowledge management. Thus, this study suggests that hospitals should enhance organizational learning, market orientation and knowledge management execution to improve operational performance. Hospital management should value rational culture, hierarchical culture, group culture, developmental culture and initiate cost leadership and differentiation implementation strategies.

Key words: Market orientation, organizational learning, operational strategies, knowledge management activities, operational performance

INTRODUCTION

Since the public's demand for medical service quality increases and the government controls various medical expenses in national health insurance, the hospitals encounter operational challenge. Under the pressure of high degree of competition, how to select proper operational strategies, include organizational learning, market orientation and organizational culture in knowledge management activities and provide customers with better product and service quality to enhance operational performance are the critical concerns in operational strategies of many hospitals. By implementation of knowledge management activities, the hospitals can keep the original customers (the patients), increase the numbers of patients, maintain positive

relationship with customers and increase competitive advantages. Foreign and domestic studies rarely included operational strategies, organizational learning, market orientation and organizational culture in knowledge management activities to probe into their effects on operational performance. Thus, this study treats the hospitals as the subjects to explore the correlation among market orientation, organizational learning, types of operational strategies, organizational culture, executive degree of knowledge management activities and operational performance.

The purposes in this study are below: (1) Probe into the effect of the hospitals' market orientation, organizational learning and hospitals' types of operational strategies and organizational culture on executive degree of knowledge management activities, (2) Probe into the

effect of executive degree of knowledge management activities on operational performance and (3) According to the findings, the researcher proposes the suggestions for the hospitals to implement knowledge management activities and upgrade operational performance.

Operational strategies: Croteau and Bergeron (2001) defined operational strategies as the organizations' actions to accomplish the goals. Porter (1980) suggested that in order to acquire or maintain competitive advantages, the firms can adopt cost leadership strategy, differentiation strategy and focus strategy. According to the firms' reactions toward environmental change, Miles and Snow (1978) divided operational strategies into four types: Prospector Strategy, Defender Strategy, Analyzer Strategy and Reactor Strategy. Durand and Coeurderoy (2001) divided operational strategies into cost leadership strategy, marketing differentiation strategy and innovation differentiation strategy. By strategy proposed by Durand and Coeurderoy (2001), this study classified operational strategies of the hospitals.

Organizational learning: Ouksel and Vyhmeister (2000) suggested that organizational learning adjusts future decision-making behavior by past experiences in order to accomplish the goals. Templeton *et al.* (2002) suggested that organizational learning means a series of organizational activities, including information acquisition, information communication, information explanation and organization memory. Tippins and Sohi (2003) divided organizational learning into information acquisition, information communication, shared interpretation and organization memory. This study treated four dimensions of organizational learning, information acquisition, information communication, shared interpretation and organization memory, proposed by Tippins and Sohi (2003) as the dimensions of organizational learning activities. This study examined four organizational learning dimensions as proposed by Tippins: (1) Information acquisition, (2) Information communication, (3) Shared interpretation and (4) Organizational memory as organizational learning activities.

Market orientation: Narver and Slater (1990) categorized market orientation into three dimensions, including customer orientation; competitor orientation and cross-department negotiation: the firms integrate corporate resources to create superior value for customers. Market orientation defined by Kohli and Jaworski (1990) includes the collection, commutation and response to market information. Narver and Slater (1990) probed into market

orientation from the perspective of culture; Based on market orientation proposed by Narver and Slater (1990), this study categorized market orientation into customer orientation, competitor orientation and cross-department negotiation as the main dimensions.

Organizational culture: Tolfo and Wazlawick (2008) suggested that organizational culture is the organizational members' values, beliefs and regulations shared. "Organizational culture" is comprised of the shared values, beliefs and social regulations of the organization's members. As to types of organizational culture, Wallach (1983) divided organizational culture into bureaucratic culture, innovative culture and supportive culture. Competing values framework proposed by Quinn (1988) includes four types: rational culture, hierarchical culture, group culture, developmental culture. Quinn (1988) proposed a competing values framework that included rational culture, group culture, hierarchical culture and developmental culture. Deshpande and Farley (1999) suggested that when the employees describe the corporate culture, they more or less show the characteristics of rational culture, hierarchical culture, group culture and developmental culture. However, generally speaking, they usually demonstrate one of the types. This study classified organizational culture according to four kinds of culture proposed by Quinn (1988).

Knowledge management activities: Carlucci *et al.* (2004) indicated that knowledge management means to organize, update, generalize, analyze and share the information in long term. Desouza (2003) defined knowledge management as the combination of knowledge creation, knowledge saving, knowledge expansion and knowledge activities in the organizations. Nonaka And Takeuchi (1995) defined knowledge management as knowledge creation, saving, spread and application. Liebowitz (1999a) suggested that knowledge management is the process of knowledge identification, acquisition, saving, sharing, application and sales. Based on current literature review, this study divided knowledge management activities into knowledge acquisition and creation, knowledge refinement, knowledge saving and knowledge sharing.

Operational performance: Slater and Narver (2000) treated Return on Investment as the indicator of performance. Croteau and Bergeron (2001) measured performance by profit capability and growth of sales. Kirca *et al.* (2005) measured the performance by overall business performance, profit rate, sales and market share. Kirca *et al.* (2005) measured overall business performance

using sales, profit rate and market share. Farrell (2000) suggested that operational performance means the performance of customer maintenance rate, new product success rate, growth of sales, Return on Investment and overall performance, in comparison to the colleagues. Tippins and Sohi (2003) measured organizational performance by profit rate, Return on Investment, customer maintenance rate and growth of sales. Profit rate, customer maintenance rate, growth of sales and return on investment were the benchmarks Tippins and Sohi (2003) used to measure organizational performance. Shrader (2001) measured operational performance by profit rate and growth of sales. In the research of Su *et al.* (2003), operational performance was measured by profit and customer satisfaction. Based on the above literatures and the characteristics of business in the hospitals, this study treated the accomplishment rate of operational goals, satisfaction with medical service quality, growth of medical incomes, return rate of old customers, enhancement of medical service efficiency, growth of number of patients and competitiveness of the hospitals as the indicators to measure operational performance of the hospitals.

Operational strategies and knowledge management activities: Shih and Chiang (2005) suggested that the firms' different operational strategies will influence the implementation of knowledge management. According to Hanizah and Ismail (2009), different types of operational strategies adopted by the firms will significantly and differently influence the execution of knowledge management activities. According to Liebowitz (1999b), in different operational strategies, the organizations will adopt different measures of knowledge management. Based on above literature review, this study proposed the hypothesis below:

H₁: Different types of operational strategies significantly and differently influence implementation of knowledge management activities

Organizational learning and knowledge management activities: Schulz (2001) indicated that organizational learning is the bridge between knowledge creation and knowledge exchange. Organizational learning capability will influence the exchange after knowledge creation. Singh (2009) indicated that the execution of organizational learning significantly and positively influences the knowledge management. Sarvary (1999) indicated that knowledge management includes three processes and one

of them is organizational learning. It is the firms' acquisition of knowledge or information. Based on above literature review, this study proposed the hypothesis below:

H₂: Organizational learning significantly and positively influences implementation degree of knowledge management activities

Market orientation and knowledge management activities: Nonaka And Takeuchi (1995) suggested that market orientation significantly influences knowledge innovation. Hsieh (2001) suggested that market orientation culture constructed by the firms will enhance the implementation of knowledge management activities. Sinkula (1994) indicated that based on market orientation, the organizations will obtain the advantages in knowledge creation. Based on above literature review, this study proposed the hypothesis below:

H₃: Market orientation significantly and positively influences implementation degree of knowledge management activities

Organizational culture and knowledge management activities: Liebowitz (1999b) suggested that in different organizational cultures, the organizations should adopt different kinds of knowledge management. Martin (2000) suggested that organizational culture is the key success factor of knowledge management. De Long and Fahey (2000) suggested that the organizations can influence the employees' behavior by culture and encourage the employees' sharing, creation and use of knowledge. According to Gold *et al.* (2001), proper organizational culture will enhance the effective knowledge management. Based on above literature review, this study proposed the hypothesis below:

H₄: Different kinds of organizational culture significantly and differently influence implementation degree of knowledge management activities

Knowledge management activities and operational performance: Choi and Lee (2003) suggested that the execution of knowledge management activities can increase organizational performance. Gold *et al.* (2001) indicated that effective knowledge management enhances corporate operational performance. Carlucci *et al.* (2004) suggested that knowledge management activities will influence operational

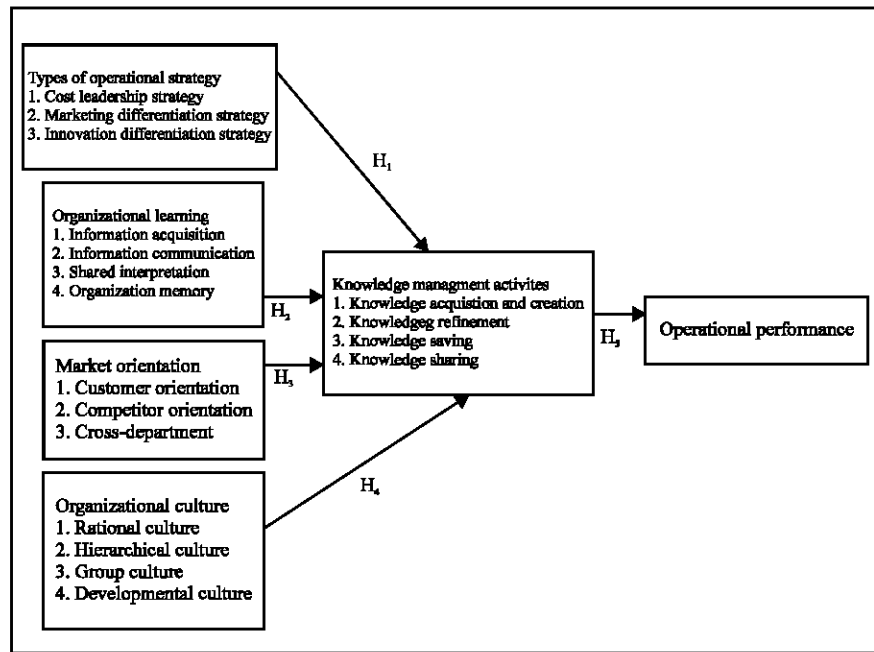


Fig. 1: Research framework

performance of the organizations. Based on above literature review, this study proposed the hypothesis below:

H₅: Implementation degree of knowledge management activities significantly and positively influences operational performance

RESEARCH METHODS

This study probes into the correlation among types of operational strategies, organizational learning, market orientation, organizational culture, knowledge management and operational performance and research framework is shown in Fig. 1.

Research hypotheses: According to literature review, the hypotheses are developed below:

H₁: Different types of operational strategies significantly and differently influence implementation of knowledge management activities

H₂: Organizational learning significantly and positively influences implementation degree of knowledge management activities

H₃: Market orientation significantly and positively influences implementation degree of knowledge management activities

H₄: Different kinds of organizational culture significantly and differently influence implementation degree of knowledge management activities

H₅: Implementation degree of knowledge management activities significantly and positively influences operational performance

Questionnaire collection and data analysis: This study treats 466 qualified hospitals in hospital evaluation and teaching hospital evaluation from 2007 to 2011 registered in Department of Health, Taiwan as the subjects. The questionnaires were anonymous and distributed to 466 hospitals at the beginning of July 2012. This study received 96 replies from Supervisors at 96 hospitals by November 2012, of which 89 were valid. The respondents of the questionnaires are the supervisors of the hospitals. Questions in the questionnaire were designed based on scholar and expert opinions and literature reviews. Reliability of the variables was shown in Table 1. Nunnally (1978) suggested that in the exploratory study, reliability at least 0.7 is acceptable. In this study, reliabilities of all variables are at least 0.7. Thus, the reliability is good. Data analysis is based on SPSS for windows and the main statistical analysis is variance analysis.

Measurement of variables: The variables include operational strategies, organizational learning, market

Table 1: Cronbach's α coefficient for all variables in this study

Questionnaire dimensions	Cronbach's α
Operational strategies	
Cost leadership strategy	0.831
Marketing differentiation strategy	0.887
Innovation differentiation strategy	0.861
Organizational learning	
Information acquisition	0.899
Information communication	0.907
Shared interpretation	0.919
Organization memory	0.893
Market orientation	
Customer orientation	0.900
Competitor orientation	0.876
Cross-department negotiation	0.853
Organizational culture	
Rational culture	0.881
Hierarchical culture	0.798
Group culture	0.861
Developmental culture	0.767
Knowledge management	
Knowledge acquisition and creation	0.770
Knowledge refinement	0.828
Knowledge saving	0.835
Knowledge sharing	0.934
Operational performance	0.949

orientation, implementation degree of knowledge management activities, operational performance and corporate scale. Measurement of variables is shown below:

Measurement of operational strategies: Based on the questionnaire developed by the related scholars (Durand and Coeurderoy, 2001; Prajogo and Sohal, 2006; Yamin *et al.*, 1997; Lynch *et al.*, 2000), this study divided operational strategies below, according to the business patterns of the hospitals:

- **Cost leadership strategy:** (a) To invest in the medical techniques or facilities which save the cost, (b) To maintain the lowest cost of medical service, (c) To reduce the cost by improving business efficiency and (d) To reduce the cost in order to provide medical service with lower prices than other competitors'
- **Marketing differentiation strategy:** (a) To provide more valuable medical services, in comparison to other competitors, (b) To provide medical services according to customers' different needs and (c) To provide medical services with higher quality and more characteristics, in comparison to competitors
- **Innovation differentiation strategy:** (a) It is difficult for competitors (colleagues) to imitate the medical services provided by the hospitals, (b) To provide better medical services, in comparison to other competitors, by re-designing the content of medical services and (c) To provide better medical services, in comparison to other competitors, by new technology or methods

Measurement of organizational learning: This study measures organizational learning by four dimensions proposed by Tippins and Sohi (2003). According to the hospitals' business patterns, organizational learning activities were allocated below:

- **Information acquisition:** (a) The hospitals regularly contact with the customers in order to find their needs and expectation, (b) The hospitals will confirm customers' needs by studies, (c) The hospitals will treat customers as the sources of market information, (d) The hospitals frequently ask about customers' needs or expectation and (e) The hospitals usually collect information related to customers' needs
- **Information communication:** (a) Members in the units of the hospitals share customer information, (b) The hospital members who need customer information can easily access the related information, (c) Representatives of the units in the hospitals will regularly exchange opinions and information in the meetings, (d) The units of the hospitals will properly share the important information collected to other units and (e) The units of the hospitals can acquire information related to medical service or customers
- **Shared interpretation:** (a) The supervisors usually share consistent views toward the customers' needs, (b) The supervisors usually share consistent views toward offering the most satisfying services for customers and (c) The supervisors usually share the consistent views toward how the important information received will influence the operation of the hospitals
- **Organization memory:** (a) The hospitals have the procedure to deal with the patients, (b) The hospitals learn to cope with the difficult customers according to past experiences, (c) The hospitals can decide the customers' needs according to standard procedure, (d) The hospitals have the standard procedure to effectively cope with customers' complaints, (e) The hospitals will recognize the customers' problems according to past experience and (f) The hospitals have complete management of customer information

Measurement of market orientation: According to the literatures (Menguc and Auh, 2006; Narver and Slater, 1990; Lukas and Ferrell, 2000; Han *et al.*, 1998), based on the business patterns of the hospitals, items of market orientation were below:

- **Customer orientation:** (a) The hospitals will systematically measure customer satisfaction, (b) Treat customer satisfaction as the priority, (c)

Provide complete medical service, (d) Follow the commitment to customers, (e) Collect related information in order to control customers' needs and (f) Continuously provide medical services creating customer value

- **Competitor orientation:** (a) The supervisors regularly discuss the advantages and disadvantages of competitors, (b) Collect competitor related information by various measures as the criteria for different units, (c) Immediately respond to the competitors' activities and (d) Continuously search for target markets with competitive advantages for the firms
- **Cross-department negotiation:** (a) The units exchange customer related information, (b) According to overall strategies of the hospitals, the units are integrated, (c) High-rank supervisors regularly visit important customers, (d) The units share the resources and (e) The units are critical in the offering of customer value

Measurement of organizational culture: Scale design is based on the modification of the measurement on organizational culture suggested by Quinn (1988), Parker and Bradley (2000) and Sun (2002). Organizational culture is divided into four types and 24 indicators:

- **Rational culture:** (a) The employees value the accomplishment of work performance, (b) High-rank supervisors play the roles as the instructors to encourage the employees to accomplish corporate goals, (c) The firms are enhanced by the accomplishment of work performance and tasks, (d) Organizational atmosphere is competition and value of achievement, (e) The firms award the employees according to the accomplishment of goals and (f) Success means to be the first among the competitors
- **Hierarchical culture:** (a) The firms have specific rules and systems, (b) The firms are the organizations with definite class division and every member's duty is regulated carefully, (c) The firms award the employees according to the statuses, (d) The firms emphasize stability and the efficiency of stable operation, (e) The firms are enhanced by regulations and policies and the successful organizational operation is valued and (f) The supervisors expect that the employees can work according to rules or procedures
- **Group culture:** (a) The firms are human organizations and value the employees' autonomy, (b) The firms are enhanced by loyalty and trust, (c) The employees trust each other and value team work and

cooperation, (d) The supervisors help the employees to demonstrate their potential, (e) The firms treat all employees equally and (f) The firms value human resources and emphasize team work

- **Developing culture:** (a) The employees are willing to undertake the risk and challenge, (b) The firms encourage the employees to pursue innovation and accept new concepts, (c) The firm often encourage the employees to think and provide new ideas or solutions, (d) The firms value growth and acquire new resources to respond to new challenge at any time, (e) The firms are enhanced by the pursuit of innovation and R and D to be the leaders in the market and (f) Organizational atmosphere is energetic

Measurement of implementation degree of knowledge management activities: According to the related literature review (Sarvary, 1999; Desouza, 2003; Alavi and Leidner, 2001; Zack, 1999; Lee and Hong, 2002; Nonaka And Takeuchi, 1995; Liebowitz, 1999a), the activities of knowledge management were divided into four dimensions:

- **Knowledge acquisition and creation:** (a) The hospitals make plans to collect internal and external knowledge, (b) The hospitals encourage the employees to create and acquire new knowledge by learning or R and D, (c) Provide educational training for the employees to acquire new knowledge and (d) Continuously collect valuable knowledge
- **Knowledge refinement:** (a) Reorganize, screen and eliminate knowledge collected, (b) Integrate and apply professional knowledge in different fields and (c) Transform the knowledge collected into one which can be easily comprehended and applied
- **Knowledge saving:** (a) Knowledge will be saved in database for the employees' checking, (b) Knowledge will be saved in the employees' mind by educational training and (c) Problem-solving proposals will be turned into files or records as the employees' criteria
- **Knowledge sharing:** (a) The units will have knowledge exchange and interaction, (b) The employees are encouraged to share knowledge, (c) Hold internal meetings to allow the employees to exchange work knowledge and learning and (d) The employees can freely express the opinions

Measurement of operational performance: According to the related literature review and business characteristics of the hospitals, the indicators were below: (1) In comparison to the competitors, the hospitals'

accomplishment rate of operational goals is higher; (2) In comparison to the competitors, customers are more satisfied with medical service quality of the hospitals, (3) In comparison to the competitors, the growth of the medical incomes of the hospitals is higher; (4) Return rate of old customer is high, (5) In comparison to the competitors, the enhancement of medical service efficiency is more significant, (6) In comparison to the competitors, growth of the number of patients in the hospitals is higher and (7) In comparison to the competitors, the hospitals have more competitive advantages.

Measurement of the characteristics of hospitals: The characteristics of the hospitals were divided into attributes of ownership and scale of the hospitals:

- **Attributes of ownership of the hospitals:** According to the classification of Department of Health, Executive Yuan, the hospitals, based on the ownership, can be divided into public hospitals, private hospitals and corporation hospitals
- **Scale of the hospitals:** According to the classification of Department of Health, Executive Yuan, scale of the hospitals is divided into medical centers, regional hospitals and local hospitals

RESULTS

Correlation between type of operational strategies and knowledge management activities: This study divides types of operational strategies (cost leadership strategy, marketing differentiation strategy and innovation differentiation strategy) into two groups (high and low). According to their means in executive degree of knowledge management (knowledge acquisition and creation, knowledge refinement, knowledge saving and knowledge sharing) in two groups, the researcher tries to find if there is significant difference (p<0.05). Table 2

shows the variance analysis test of operational strategies on executive degree of knowledge management. The result supported H₁: different types of operational strategies will significantly influence executive degree of knowledge management. Executive degrees of cost leadership strategy, marketing differentiation and innovation differentiation strategy will significantly influence the implementation of knowledge management activities.

Correlation between correlation between organizational learning and executive degree of knowledge management: Organizational learning (information acquisition, information communication, shared interpretation and organization memory) is divided into two groups (high and low). According to the means of executive degree of knowledge management (knowledge acquisition and creation, knowledge refinement, knowledge saving and knowledge sharing) in two groups, the researcher tries to find if there is significant difference (p<0.05). Table 3 is the variance analysis test of organizational learning on executive degree of knowledge management. The result supported H₂: organizational learning significantly and positively influences executive degree of knowledge management.

Correlation between executive degree of market orientation and that of knowledge management: Market orientation (customer orientation, competitor orientation and cross-department negotiation) is divided into two groups (high and low). According to means of executive degree of knowledge management (knowledge acquisition and creation, knowledge refinement, knowledge saving and knowledge sharing) in two groups, the researcher tries to find if there is significant difference (p<0.05). Table 4 is the variance analysis test of market orientation on executive degree of knowledge management. The result supported H₃: executive degree of market orientation significantly and positively influences that of knowledge management.

Table 2: ANOVA of operational strategies on executive degree of knowledge management

	Knowledge acquisition and creation				Knowledge refinement				Knowledge saving				Knowledge sharing			
	Low [#]	High [#]	F-value	p-value	Low [#]	High [#]	F-value	p-value	Low [#]	High [#]	F-value	p-value	Low [#]	High [#]	F-value	p-value
Cost leadership	3.46	4.01	20.00	<0.001	3.38	3.87	13.30	<0.001	3.51	3.88	7.39	0.008	3.60	4.11	16.93	<0.001
Marketing differentiation	3.25	3.97	26.03	<0.001	3.07	3.86	28.38	<0.001	3.16	3.91	26.38	<0.001	3.41	4.06	21.98	<0.001
Innovation differentiation	3.52	4.02	17.07	<0.001	3.39	3.91	16.00	<0.001	3.52	3.91	8.55	0.004	3.64	4.13	17.28	<0.001

[#]Low: Executive degree of operational strategies is lower than 3.50, High: Executive degree of operational strategies is higher than 3.50, *p<0.05

Table 3: ANOVA of organizational learning on executive degree of knowledge management

	Knowledge acquisition and creation				Knowledge refinement				Knowledge saving				Knowledge sharing			
	Low [#]	High [#]	F-value	p-value	Low [#]	High [#]	F-value	p-value	Low [#]	High [#]	F-value	p-value	Low [#]	High [#]	F-value	p-value
Information acquisition	3.54	3.94	8.50	0.005	3.37	3.84	11.03	0.001	3.44	3.89	10.43	0.002	3.65	4.05	9.13	0.003
Information communication	3.31	3.98	25.31	<0.001	3.14	3.88	27.11	<0.001	3.23	3.92	24.44	<0.001	3.47	4.07	20.70	<0.001
Shared interpretation	3.59	3.95	8.01	0.006	3.50	3.81	4.96	0.029	3.55	3.87	5.62	0.020	3.68	4.07	9.62	0.003
Organization memory	3.25	3.87	7.96	0.006	3.21	3.74	4.98	0.028	3.12	3.81	9.10	0.003	3.47	3.97	5.27	0.024

[#]Low: Executive degree of organizational learning is lower than 3.50, High: Executive degree of organizational learning is higher than 3.50, *p<0.05

Table 4: ANOVA of market orientation on executive degree of knowledge management

SoV	Knowledge acquisition and creation				Knowledge refinement				Knowledge saving				Knowledge sharing			
	Low [#]	High [#]	F-value	p-value	Low [#]	High [#]	F-value	p-value	Low [#]	High [#]	F-value	p-value	Low [#]	High [#]	F-value	p-value
Customer orientation	3.25	3.86	6.79	0.011	3.10	3.74	6.67	0.011	3.24	3.79	5.02	0.028	3.21	3.98	11.85	0.001
Competitor orientation	3.47	3.95	12.25	0.001	3.36	3.82	9.84	0.002	3.44	3.87	8.77	0.004	3.69	4.02	5.52	0.021
Cross-department negotiation	3.41	3.98	18.68	<0.001	3.39	3.82	8.77	0.004	3.35	3.92	17.15	<0.001	3.64	4.04	8.62	0.004

[#]Low: Executive degree of market orientation is lower than 3.50, High: Executive degree of market orientation is higher than 3.50, *p<0.05

Table 5: ANOVA of types of organizational culture on executive degree of knowledge management

SoV	Knowledge acquisition and creation				Knowledge refinement				Knowledge saving				Knowledge sharing			
	Low [#]	High [#]	F-value	p-value	Low [#]	High [#]	F-value	p-value	Low [#]	High [#]	F-value	p-value	Low [#]	High [#]	F-value	p-value
Rational culture	3.26	3.96	24.49	<0.001	3.07	3.86	28.38	<0.001	3.30	3.87	13.57	<0.001	3.30	4.09	35.93	<0.001
Hierarchical culture	3.38	3.97	18.43	<0.001	3.29	3.83	13.28	<0.001	3.36	3.88	12.73	0.001	3.46	4.09	23.47	<0.001
Group culture	3.31	3.96	21.01	<0.001	3.13	3.86	23.44	<0.001	3.30	3.88	14.56	<0.001	3.33	4.10	35.55	<0.001
Developmental culture	3.43	4.05	27.26	<0.001	3.29	3.94	26.00	<0.001	3.43	3.95	15.71	<0.001	3.58	4.14	22.17	<0.001

[#]Low: executive degree of organizational culture is lower than 3.50; High: Executive degree of organizational culture is higher than 3.50; *p<0.05

Table 6: ANOVA of effect of knowledge management executive degree on operational performance

SoV	Operational performance			
	Low [#]	High [#]	F-value	p-value
Knowledge acquisition and innovation	3.18	3.64	14.92	<0.001
Knowledge refinement	3.26	3.67	14.20	<0.001
Knowledge saving	3.31	3.63	8.10	0.006
Knowledge sharing	3.05	3.61	15.37	<0.001

[#]Low: Executive degree of knowledge management is lower than 3.50, High: Executive degree of knowledge management is higher than 3.50, *p<0.05

Correlation between organizational culture and executive degree of knowledge management:

Types of organizational culture (rational culture, hierarchical culture, group culture, developmental culture) are divided into two groups (high and low). According to means of knowledge management executive degree (knowledge acquisition and creation, knowledge refinement, knowledge saving and knowledge sharing) in two groups, the researcher tries to find if there is significant difference (p<0.05). Table 5 is the variance analysis test of organizational culture on executive degree of knowledge management. The result rejected H₄: different types of organizational culture significantly and differently influence executive degree of knowledge management. According to the finding, different types of organizational culture (rational culture, hierarchical culture, group culture and developmental culture) do not significantly influence the executive degree of knowledge management. The higher the executive degrees of different types of organizational culture are, the higher the executive degree of knowledge management will be. Thus, if the firms can combine and use the characteristics of these cultures, they will considerably enhance the executive degree of knowledge management.

Relationship between execution of knowledge management and operational performance:

This study divides executive degree of knowledge management (knowledge acquisition and innovation, knowledge

Table 7: ANOVA of Hospital characteristics (attributes of ownership of the hospitals and scale of the hospitals) and executive involvement in each phase of knowledge management activities

SoV	Attributes of ownership of the hospitals		Scale of the hospitals	
	F-value	p-value	F-value	p-value
Knowledge acquisition and innovation	1.67	0.194	2.13	0.125
Knowledge refinement	0.16	0.849	2.00	0.142
Knowledge saving	1.57	0.215	1.51	0.227
Knowledge sharing	1.13	0.329	0.93	0.397

Table 8: ANOVA for hospital characteristics (attributes of ownership of the hospitals and scale of the hospitals) and business performance

SoV	Attributes of ownership of the hospitals		Scale of the hospitals	
	F-value	p-value	F-value	p-value
Business performance	0.23	0.795	2.11	0.128

refinement, knowledge saving and knowledge sharing into two groups (high and low executive degree). According to means of operational performance in two groups, the researcher tries to find if there is significant difference (p<0.05). Table 6 is the variance analysis test of effect of knowledge management executive degree on operational performance. The result supported H₅: the higher the executive degree of knowledge management is the most significant and positive effect it will be on operational performance.

The influence of the executive degree of knowledge management activities of the hospitals with different characteristics on business performance:

The results in Table 7 show that attributes of ownership of the hospitals and scale of the hospitals do not have a significant influence (p<0.05) on the executive degree of knowledge management activities. Table 8 reveals that the hospitals from different attributes of ownership of the hospitals and scale of the hospitals do not reveal a significant influence (p<0.05) on their business performance. As seen above, for the hospitals with different characteristics (attributes

of ownership of the hospitals and scale of the hospitals), the executive degree of knowledge management activities do not reveal significant impact on business performance.

CONCLUSION

Research findings demonstrate that the higher the executive degrees of cost leadership, marketing differentiation and innovation differentiation strategy are, the more significant and positive effect it will be on the executive degree of knowledge management; different types of organizational culture (rational culture, hierarchical culture, group culture and developmental culture) do not significantly influence executive degree of knowledge management. The higher the executive degrees of rational culture, hierarchical culture, group culture and developmental culture are, the more significant the effect will be on executive degree of knowledge management. Thus, if the firms can combine and use these four cultures, they will significantly enhance executive degree of knowledge management. In addition, the higher executive degree of knowledge management is, the more significant and positive effect it will be on operational performance. This study suggests that to increase overall performance, firms should enhance organizational learning, market orientation and knowledge management activities. The firm leadership should value and instill in their employees rational culture, hierarchical culture, group culture and developmental culture. The core business strategy should include cost leadership and differentiation strategy (marketing differentiation and innovation differentiation strategy).

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