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**An Evaluation of Critical Project
Management Disciplines for
Improving Healthcare & Medical
Services—The Perspective from
Hospital Personnel**

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**An Evaluation of Critical Project Management Disciplines for
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Abstract

Healthcare and medical services play a vital role in the global new economy and social welfare systems. Many healthcare and medical organizations are growing rapidly and the services provided are becoming more project-oriented. Medical projects and administrative projects, such as purchasing and installing new equipment, launching new community medical and healthcare services, procedures and practices associated with internal and external communications, and coordination of internships with universities and other hospitals, were frequently observed in modern healthcare and medical industry. Similar with the tasks in project intensive industries such as IT and product developments, the need to apply project management skills in healthcare and medical organizations is getting higher and higher, especially in large hospitals and medical centers with sizable personnel, work procedures, and management functions. Previous studies have proposed that the support of medical staff would be one of the most critical success factors for implementing modern project management in hospitals and healthcare organizations. Therefore, it is worth to further investigate if there are critical project management disciplines for strengthening the abilities of medical staff in hospitals and healthcare organizations.

From the perspective of hospital personnel, this study evaluates the impacts of project management disciplines on improving the personnel's work performance as well as the quality of their healthcare & medical services. Through questionnaires survey and statistical analysis, nine major project management knowledge areas and their effective level are individually analyzed by examining each relationship between personnel' project management competency and their work performance. Correlation analysis and multi-variate regression models are applied to identifying the critical project management knowledge areas for improving individual work performance. The research results provide a managerial and institutional guideline for hospital & medical centers. The personnel's administrative capability as well as work performance can consequently be improved by specific educational and training programs of project management skills.

Keywords: project management, performance evaluation, healthcare, medical service, project organization

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1. Research Background

At present, major hospitals in Taiwan are facing many operation and management-related problems, such as the promotion of electronic medical records, lack of manpower, materials, and devices, excessive procurement leading to high cost, etc. Moreover, in recent years, with the rise of consumer (patient) awareness, fiscal shortage of National Health Insurance (NHI), restrictions of Global Budget Payment System, influence of Diagnosis Related Group (DRGs), strict inspection on various quality indices, and strict requirement of hospital accreditation, hospitals have been forced to invest in more human, financial, and material resources. Therefore, various large-scale and small-scale medical institutions are facing increasing difficulties in operation and management. To look for the opportunity of sustainable operation, to conform to the rapid change in medical environment and to respond to the increasing specific needs, the implementation of project management may help meet the objective of medical innovative development. Consequently, the application of project management knowledge system and methods to hospital management is a tool worthy of promotion (Sun Cho-chin, 2009).

2. Research Objectives

The purpose of this study is to investigate the relationship between project management competences and work performance of people working in medical institutions and to understand how nine knowledge areas of project management affect the work performance of people working in medical institutions. It is hoped that the research results can be provided as reference for management of medical organization and members to further support organizations to flexibly apply project management skills, to improve manpower quality and work performance, and to achieve the objective of sustainable operation of hospitals.

3. Literature Review

3-1. Classification of medical institutions and people working in medical institutions

The medical institutions in this study are the medical centers as defined by the current “Establishment Standards for Medical Institutions” and “Payment Standard for Bureau of National Health Insurance.”

The people working in medical institutions are the required manpower included in the 2011 hospital accreditation as defined by “Establishment Standards for Medical Institutions” and “Taiwan Joint Commission on Hospital Accreditation,” including 8 categories of medical personnel - physicians, nurses & midwives, pharmacists, medical laboratory staff, medical radiation

technicians, nutritionists, rehabilitation therapists, and administrative staff practically implementing various projects.

3-2. Definition of project management

According to the literature review, this study defined project management as: an organization's establishment of a specific objective where the five phases of project management are applied to its nine knowledge areas and the cooperation of the project team to systemically manage and apply limited resources, as well as to integrate manpower and material resources to achieve the specific objective (International Project Management Knowledge System, 2005; A Guide to Body of Knowledge of Project Management, 2008; Karen E.Papke-Shields, Catherine Beise, Jing Quan, 2009; Huang, 2010; James P.Lewis, 2011).

3-3.The knowledge areas of project management

PMBOK® Guide divides project management procedures into five phases: initiation, planning, execution, monitoring, and completion. PMI divides project management into the following nine knowledge areas according to the characteristics of project (Karen E.Papke-Shields, Catherine Beise, Jing Quan (2010), James P.Lewis, 2011): integration management, scope management, time management, cost management, quality management, human resources management, communication management, procurement management, and risk management.

3-4.Project Management Competences, Project Management Maturity (PMM)

Project management competences refer to the capacity to design a complete project, the possession of sufficient professional and technical capacity, communication and negotiation capacity, and the capacity to analyze and manage a project. Project management competences include individual project management competences and team project management competences. The improvement in various capacities of team members, such as project management theories, concepts, methods, and techniques, can help improve team project management competences and achieve the success of project objective (eik/Roberts, 1993; Senge, 1994; Willke, 1998; Gareis, 2000; Lai, 2011).

According to Papke-Shields (2010) , the nine knowledge areas of project management , were translated and summarized to design the content of the research questionnaire for assessing the individual project management competences of people working in medical institutions in this study.

3-5. Work performance

The research questionnaire assessed individuals' overall performance. This study used the amended "work performance scale" developed by Robbins (1998) and the self-assessment for subjective perception to edit the questionnaire content for assessing work performance. Although this quality index cannot accurately assess work performance, it is still widely used

(Locher & Teel, 1998; Cheng, 2001; Chang, 2009; Liu, 2009; Chen, 2010; Hsiao, 2010; Pan, 2010; Yang, 2010).

4. Research Method

This study used project management competences as the independent variables and used work performance as the dependent variable. In addition, this study took into account the properties of staff and investigated them according to the classification of management positions and non-management positions.

The questionnaire content includes three major parts: Part 1 “work characteristics” – it assessed individuals’ work characteristics (PMI, 2000). Part 2 “project management competences” – it was the scale assessing individual project management competences (Papke-Shields, 2010). Part 3 “work performance” – the amended “work performance scale” developed by Robbins (1998) and self-assessment for subjective perception were used.

A 5-point Likert scale was applied to the questionnaire survey. The subjects answered the questions according to their work styles (habits) by filling in the frequency of daily use – “never (1 point),” “seldom (2 point),” “occasionally (3 points),” “often (4 points),” and “always (5 points).” The total score of all the subjects were calculated. The higher the total score was, the higher the possibility that the subjects’ work was associated with project management and the higher their project management competences were.

This study used purposive sampling to select subjects. The subjects included physician, nurse practitioners, medical laboratory staff, medical radiation technicians, nutritionists, rehabilitation therapists, and administrative staff.

5. Questionnaire Results and Analysis

A total of 220 questionnaires were distributed, and 198 valid questionnaires were returned. Among which, 12 questionnaires were distributed to physicians, and 12 valid questionnaires were returned; 35 questionnaires were distributed to nurse practitioners, and 35 valid questionnaires were returned; 20 questionnaires were distributed to pharmacists, and 20 valid questionnaires were returned; 53 questionnaires were distributed to medical laboratory staff, medical radiation technicians, nutritionists, and rehabilitation therapists, and 52 valid questionnaires were returned; 100 questionnaires were distributed to administrative staff, and 79 valid questionnaires were returned, with a valid return rate of 90%.

This study used SPSS statistical analysis software to analyze the data of the returned samples, and used Descriptive statistics analysis to analyze and interpret basic information. “Cronbach’s alpha coefficient” was used to test the reliability. Nunnally (1978) and Devellis et al. (1991) suggested that when the

value of Cronbach’s alpha is less than 0.3, the reliability is low. When the value of Cronbach’s alpha is between 0.3 and 0.7, the reliability is acceptable. When the value of Cronbach’s alpha is larger than 0.7, the reliability is high. This study used questionnaire survey as the tool to collect data and used the data from literature review as the theoretical basis. In addition, this study used the scale and assessment items which were used by domestic and foreign scholars to edit the project management competence and work performance scale. Therefore, the validity of the assessment tool and scale used in this study should be acceptable. This study used Pearson’s correlation analysis to test the nine knowledge areas of project management in order to understand the correlation among control variables, independent variables, and dependent variable. This study also used stepwise regression analysis to investigate the effect of project management competences of people working in medical institutions on their work performance.

5-1. Analysis on basic information:

Table 5-1 The research samples

Research samples	Basic variables	Number of subjects	%
1. Gender	Male	36	18.2
	Female	162	81.8
2. Age	20 years old and under	0	0
	21~30 years old	48	24.2
	31~40 years old	64	32.3
	41~50 years old	62	31.3
	51~60 years old	24	12.1
	61 years old and above	0	0
3. Level of education	Junior high school	0	0
	Senior high school and vocational senior high school	7	3.5
	Junior college	21	10.6
	College	90	45.5
	Graduate school and above	80	40.4
4. Seniority	Less than 1 year	3	1.5
	1~3 years	20	10.1
	3~5 years	18	9.1
	5~10 years	42	21.2
	More than 10 years	115	58.1
5. Work categories	Physicians	12	6.1
	Nurse practitioners	35	17.7
	Pharmacists	20	10.1
	Medical technicians	52	26.3
	Administrative staff	79	39.9
6. Work level	Non-management positions	164	82.8
	Management positions	34	17.2

5-2 Results of reliability test of research questionnaire constructs

Table 5-2 Results of reliability test of research questionnaire constructs

Variables	Constructs	Cronbach's alpha value	Test results
Work characteristics	Work characteristics	.882	High reliability
Project management competences	Management competence for integration	.868	High reliability
	Management competence for scope	.863	High reliability
	Management competence for time	.857	High reliability
	Management competence for cost	.860	High reliability
	Management competence for quality	.858	High reliability
	Management competence for human resource	.861	High reliability
	Management competence for communication	.861	High reliability
	Management competence for risk management	.892	High reliability
	Management competence for procurement	.860	High reliability
Work performance	Work performance	.875	High reliability

5-3 Analysis of Correlation

This study used Pearson's correlation analysis to analyze the correlation. nine knowledge areas of project management were used as independent variables and work performance was used as dependent variable to analyze whether there is a correlation between various constructs as the preliminary verification. A larger correlation coefficient indicates a more significant correlation. The data analysis showed that the correlation between non-management and all the constructs was significant, and that between management positions and scope, time, and integration was significant.

Table 5-3 Correlation coefficients and hypothesis testing of management positions and non-management positions

Knowledge area	Management positions	Non-management positions
	Work performance	Work performance
Scope	.641**(P<0.01)	.287**(P<0.01)
Time	.625**(P<0.01)	.223**(P<0.01)
Cost	.257(P>0.05)	.255**(P<0.01)
Quality	.463**(P<0.01)	.342** (P<0.01)
Human resources	.338(P>0.05)	.353** (P<0.01)
Communication	.424*(P<0.05)	.426 ** (P<0.01)
Risk	.331(P>0.05)	.278** (P<0.01)
Procurement	.162(P>0.05)	.242** (P<0.01)
Integration	.484**(P<0.01)	.418** (P<0.01)

(*).P<0.05, (**).P<0.01.

5-4. Stepwise Regression

The stepwise regression analysis found in the model of research samples at management positions that the management competence for scope had the most significant effect on work performance. The first variable entering the model as the best independent variable was the project competence for scope and could explain 22.3% of the variance ($F=22.269$, $p=.000$). The explanatory power of the adjusted R^2 of the construct was .392%. The F test found that the explanatory power was statistically significant ($F=.392$, $p=.000$). The coefficient estimates of stepwise analysis found that the management competence for scope was the only independent variable included in the model, and it could independently predict the dependent variable ($\beta=.641$, t value= 4.719 , $p=.000$). Because only one variable was included, there was no collinearity, namely, the predictive power of the management competence for scope for work performance was not intervened with by other 8 variables (Wu, 1999; Chiu, 2011).

The coefficient estimates of regression analysis found in the model of the research samples at non-management positions that both the management competence for communication and management competence for integration were correlated with work performance. Management competence for communication was firstly included in Model 1, and the variable could independently predict the dependent variable ($\beta=.426$, t value = 5.985 , $p=.000$). Because only one variable was included, there was no collinearity, namely, the predictive power of management competence for communication for work performance was not intervened with by other 8 variables. The management competence for integration was included in the coefficient estimates of Model 2 ($\beta=.263$, $t=3.153$, $p=.002$). The β coefficient of the management competence for communication decreased to .279 ($t= 3.348$, $p=.001$), suggesting that the effect of management competence for communication was reduced because the effect of management competence for integration was ruled out.

6. Conclusion and Suggestions

6-1. Conclusion

According to the results of questionnaire survey, this study reached the following conclusions:

1. In subjects at different work level, there was a significant correlation between their project management competences and work performance. For example, the overall correlation coefficients of nine knowledge areas of project management were significant in subjects at non-management positions.
2. Different work levels had different effects on work performance. For example, the effect of management positions on management competence for scope was the most significant, while the effect of non-management positions on management competence for communication and integration was the most significant.

3. In subjects at different work levels, it was found that, as the work nature of non-management staff was associated with the nature of project management, the effect of project management competences on work performance was more significant than that on staff at management positions. The comparison of the correlation coefficients of management positions and non-management positions showed that, among nine knowledge areas of management positions, three correlation coefficients were significant. However, those of nine knowledge areas of non-management positions were all significant, suggesting that, as the work nature of non-management staff was associated with the nature of project management, the effect of project management competence on work performance was more significant than that on staff at management positions.

6-2. Suggestions

The data analysis showed that, as a whole, there was a significant correlation between project management competences and work performance. However, the level of effect varied. Therefore, this study provided medical institutions with the suggestions of planning of future in-service training course direction for internal staff:

1. Suggestions to current staff: staff, no matter whether their work level is, should be provided with in-service training courses concerning the project management competences that they less frequently use or the constructs they are unfamiliar with. Moreover, the continuing education concerning project management competences that are frequently used or constructs with more significant effect on work performance should be strengthened. Both in-service training and continuing education should be provided to strengthen current staff's project management competences and to improve their work performance.
2. Suggestions to novices: the novice education training courses concerning the construct with the most significant effect on work performance in medical institution can be provided first to effectively improve work performance. In addition, novices should be concurrently provided with the education training of the project management competence which has a minor effect on work performance.

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