



UNIVERSITI PUTRA MALAYSIA

**APPLICATION OF PROJECT MANAGEMENT PRINCIPLES
IN THE PUBLIC SECTOR'S ARCHITECTURAL DESIGN
PRACTICE**

REYMUND R. SANDANASAMY

FK 2002 85



**APPLICATION OF PROJECT MANAGEMENT PRINCIPLES
IN THE PUBLIC SECTOR'S ARCHITECTURAL DESIGN
PRACTICE**

By

REYMUND R. SANDANASAMY

**Thesis Submitted to the School of Graduate Studies,
Universiti Putra Malaysia, in Fulfilment of Requirement
for the Degree of Master of Science**

August 2002



DEDICATION

*“ In memory of my beloved father,
who always had positive outlook on me,
in good times and in bad times – had trust in me.”*

*“ Almighty God, I thank thee that thou hast heard me.
And I know thou hears me always.”*

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfillment of the requirement for the degree of Master of Science

**APPLICATION OF PROJECT MANAGEMENT PRINCIPLES
IN THE PUBLIC SECTOR'S ARCHITECTURAL DESIGN
PRACTICE**

By

REYMUND R. SANDANASAMY

August 2002

Chairman: Associate Professor Mohd Razali Abd Kadir, Ph.D.

Faculty: Engineering

The implementation of MS-ISO 9000 Standards in Public Works Department of Malaysia, had an impact on the future direction of the project management phenomenon in the architectural design practice. It is through this implementation exercise that the public sector's architectural design practice made its first attempt to understand the concept of project management and its philosophy. The MS-ISO 9000 Standards which incorporates project management practice in its guidelines are the main source of direction and guiding principles for PWD's architectural design practice. Hence this saw the need for project management thinking in the public sector.

The main thrust of this study is to investigate and ascertain through questionnaire survey, the adoptability and relevancy of project management principles in the public sector's architectural design practice. A total of 90

survey returns were received, which represented 81.8 percent of the total 110 questionnaire forms distributed. The sample population for the study is focused on the managerial and professional level of the public sector's architectural design practice. The data gathered through various survey instruments were subjected to rigorous statistical analysis with the use of Statistical Package for Social Science, version 10.5 (1999) using descriptive and correlation statistical analysis.

It was found that majority of the architects recognize the characteristics of project management and its relevancy in their creative orientated practice. Thus, it is evident in the survey findings that project management principles as defined in this thesis is applicable in the public sector's architectural design practice, and generally has increased the awareness of the architects towards time, cost and quality requirements of the projects. The elements of system approach namely project organization mission, project objectives, project goals and short-term targets are found in the PWD's architectural design practice. All these elements contribute to the functioning of the architectural design practice. It is therefore apparent from the survey that project management principles, after its inception, contributes to the overall success of the PWD's building projects. However the thesis has also identified several drawbacks of the project management principles in the architectural design practice, but they do not adversely affect the contribution of the project management practice in the continuous success of the PWD's architectural practice.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia
sebagai memenuhi keperluan untuk ijazah Master Sains

**APLIKASI PRINSIP-PRINSIP PENGURUSAN PROJEK
DALAM PRAKTIS REKA BENTUK SENI BINA SEKTOR
AWAM**

Oleh

REYMUND R. SANDANASAMY

Ogos 2002

Pengerusi: Profesor Madya Mohd Razali Abd Kadir, Ph.D.

Fakulti: Kejuruteraan

Implementasi kualiti pengurusan ISO 900 dalam Jabatan Kerja Raya (JKR) Malaysia telah meninggalkan kesan yang mendalam terhadap penentuan hala tuju masa hadapan fenomena pengurusan projek dalam praktis reka bentuk seni bina. Menerusi langkah implementasi inilah, percubaan pertama telah dilakukan dalam praktis reka bentuk seni bina sektor awam untuk memahami konsep dan falsafah pengurusan projek. Jelasnya, kualiti ISO 900 yang menjalinkan praktis pengurusan projek dalam tataurusannya merupakan asas dan prinsip-prinsip yang menentukan hala tuju, dan dijadikan garis panduan bagi praktis reka bentuk seni bina JKR. Justeru, timbul kesedaran tentang keperluan penerapan corak pemikiran pengurusan projek dalam sektor awam.

Jelasnya, sasaran utama kajian ini adalah untuk menyelidik dan menentukan sejauh mana penerapan prinsip-prinsip pengurusan projek dan



kesesuaiannya dalam praktis seni bina sektor awam melalui kaedah tinjauan (survey) dengan menggunakan soal-selidik. Sehubungan dengan itu, sejumlah 90 maklum balas telah diterima hasil daripada tinjauan yang dijalankan, yakni mewakili 81.8 % daripada jumlah 110 borang soal-selidik yang diedarkan. Populasi sampel bagi kajian ini terdiri daripada kumpulan pengurusan dan professional dalam praktis reka bentuk seni bina di sektor awam. Data-data yang dikumpul melalui pelbagai instrumen ini pula tertakluk pada analisis statistik yang rapi dengan penggunaan SPSS (Statistical Package for Social Science) yang berbentuk deskriptif dan analisis statistik korelasi.

Pentingnya, didapati bahawa kebanyakan arkitek mengenali ciri-ciri pengurusan projek dan kaitannya dengan praktis mereka yang berteraskan kreativiti. Justeru, terbukti menerusi hasil tinjauan ini bahawa prinsip-prinsip pengurusan projek sebagaimana ditakrifkan dalam tesis ini, dapat diaplikasi dalam praktis reka bentuk seni bina di sektor kerajaan. Di samping itu, prinsip-prinsip ini juga, pada keseluruhannya telah mempertingkatkan kesedaran arkitek-arkitek tentang tuntutan faktor masa, kos, dan kualiti dalam pengendalian sesuatu projek. Di samping itu, dalam praktis seni bina JKR juga, terdapat elemen-elemen pendekatan sistem, khasnya misi organisasi projek, objektif-objektif dan matlamat projek serta sasaran jangka pendek. Kesemua elemen ini menyokong perjalanan praktis reka bentuk dalam bidang berkenaan. Malah tinjauan ini turut membuktikan hakikat bahawa setelah diaplikasi daripada peringkat awal, prinsip-prinsip

pengurusan projek berperanan menyumbang ke arah sukses yang berterusan bagi projek-projek binaan JKR.

Walau bagaimanapun tesis ini turut mengenal pasti beberapa kepincangan berhubung dengan penerapan prinsip-prinsip pengurusan projek dalam praktis reka bentuk seni bina. Meskipun demikian, kekurangan ini tidak sama sekali menjejaskan sumbangan pengurusan projek ke arah sukses berterusan dalam praktis reka bentuk seni bina JKR.

AKNOWLEDGEMENTS

First and foremost, I wish to express my heartfelt and sincere thanks to my supervisor, Associate Professor Dr. Mohd Razali Abdul Kadir, for his guidance, advice and constant pressure throughout the course of preparing this thesis. Without him the entire preparation may not have been so meaningful and successful to me.

Recognition and appreciation are extended to Associate Professor Dr. Mohd Saleh Jaafar and Ir. Salihudin Hassim for their advisory and guidance in the development of this study.

Last but not least, I wish to express my deep appreciation to my family especially my mother, who has been the source of inspiration, motivation and encouragement for me to complete this research. Special appreciation to my wife and son for their understanding, sacrifice and encouragement during the times of dire need, without which this report would not have been successfully completed.

This thesis submitted to the Senate of Universiti Putra Malaysia has been accepted as fulfillment of the requirement for the degree of Master of Science. The members of the Supervisory Committee are as follows :

MOHD RAZALI ABD KADIR, Ph.D.

Associate Professor
Faculty of Engineering
Universiti Putra Malaysia
(Chairman)

MOHD SALEH JAAFAR, Ph.D.

Associate Professor
Faculty of Engineering
Universiti Putra Malaysia
(Member)

SALIHUDIN HASSIM, Ir.

Lecturer
Faculty of Engineering
Universiti Putra Malaysia
(Member)

AINI IDERIS, Ph.D.
Professor/Dean
School of Graduate Studies
Universiti Putra Malaysia

Date:

TABLE OF CONTENTS

		Page
DEDICATION		ii
ABSTRACT		iii
ABSTRAK		v
ACKNOWLEDGEMENTS		viii
APPROVAL		ix
DECLARATION		xi
TABLE OF CONTENTS		xii
LIST OF TABLES		xv
LIST OF FIGURES		xvii
LIST OF APPENDICES		xviii
LIST OF ABBREVIATIONS		xix
CHAPTER		
1	INTRODUCTION	
	1.1 Background	1
	1.1.1 Rationale of the Study	1
	1.1.2 Project Management Rationale	3
	1.2 Research Objectives	5
	1.3 Research Questions	6
	1.4 Scope and Limitation	6
	1.5 Significance of the Study	9
	1.6 Research Methodology	10
	1.7 Thesis Structure (Framework)	12
2	LITERATURE REVIEW	
	2.1 Introduction	15
	2.2 An Overview on PM Practices	16
	2.2.1 Common Problems	17
	2.2.2 Effectiveness of PM in Building Projects	18
	2.2.3 Developing PM Competency	20
	2.2.4 PERT and PACE PM Techniques	22
	2.3 The Evolution and Development of PM	23
	2.3.1 Project Management Background	23
	2.3.2 The Emergence of PM	24
	2.3.3 The Growth of PM	27
	2.3.4 What is Project?	30
	2.3.5 Definition of PM	31
	2.3.6 Significance of PM	34
	2.3.7 The Functions of PM	35
	2.3.8 The Principles Of PM	38
	2.3.8.1 Putting it Down in Words	39
	2.3.8.2 Action with the Ends in Mind	40
	2.3.8.3 Charting the Path of Action	41

2.3.8.4	Setting of Performance Standards	42
2.3.8.5	Monitoring of Changes	42
2.4	Design Planning and Architectural Management	43
2.4.1	Creativity	43
2.4.2	Managing Creativity	44
2.4.3	Key Principles in Architectural Management	46
2.4.4	Design Process	47
2.4.5	Controlling the Design Process	50
2.4.6	Planning the Design Process	52
2.4.7	Architectural Design Management	53
2.4.8	Architectural Management and Practice	55
2.5	Implementation of PM Principles in PWD of Malaysia	58
2.5.1	Background	58
2.5.2	Mission, Objectives, and Functions	59
2.5.2.1	Mission	59
2.5.2.2	Objectives	59
2.5.2.3	Functions	60
2.5.3	Organization Structure	60
2.5.4	Traditional Approach	64
2.5.5	Transition From Traditional Approach to Innovative Process Organization in PWD	65
2.5.6	Structured Design Development Process	68
2.5.7	Quality Management Systems (QMS)	74
2.5.7.1	Policy Manual	75
2.5.7.2	The Management Procedures Manual	75
2.5.7.3	General Procedures Manuals	76
2.5.7.4	Technical Procedures Manuals	76
2.5.8	Management by Objectives (MBO)	77
2.6	Summary	78
3	RESEARCH METHODOLOGY	
3.1	Introduction	80
3.2	Research Methods Adopted in Previous Studies	80
3.3	Research Design	83
3.4	Scope of Study	87
3.5	Development of Survey Instruments	88
3.6	Data Collection	90
3.7	Data Analysis	91
3.8	Summary	92
4	DATA ANALYSIS	
4.1	Introduction	94
4.2	Study Sample	96
4.3	Structure of Questionnaire	97
4.4	Pilot Study	97
4.5	Actual Survey	98
4.6	Results of Questionnaire Survey	99
4.6.1	Respondents Background	99
4.6.2	Adoptability of Project Management	106

4.6.3	Acceptability of Project Management	109
4.6.4	The Presence of PM Characteristics	114
4.6.5	Project Management Drawbacks	118
4.6.6	PM Principle of Putting it Down in Words	127
4.6.7	PM Focus on Setting Time, Cost & Quality	129
4.6.8	PM Setting Quality Standards	131
4.6.9	PM Constantly Monitoring & Checking	134
4.6.10	Implementation of PM requires Changes to Organization Structure	136
4.6.11	Future of Architectural Practice	139
4.6.12	Pearson Correlation	141
4.7	Summary	144
5	CONCLUSION AND RECOMMENDATION	
5.1	Introduction	145
5.2	Conclusions	146
5.2.1	Can PM Principles Be Adopted in the Public Sector's Architectural Design Practice ?	147
5.2.2	Are PM Principles Relevant to the Public Sector's Architectural Design Practice?	150
5.2.3	Can PM Principles Acceptable in the Public Sector's Architectural Design Practice?	152
5.2.4	Would the Adoption of PM Principles Requires Changes in the Organization Structure?	153
5.3	Recommendations	154
5.4	Summary	158
	REFERENCE / BIBLIOGRAPHY	160
	APPENDIX A	169
	APPENDIX B	170
	APPENDIX C	172
	VITA	184

LIST OF TABLES

Table	Page
1. Frequency Distribution on the Age Groups	99
2. Respondents' Gender Ratio Frequency Distribution	101
3. Respondents' Seniority Ranking Distribution	102
4. Respondent's Years of Service	103
5. Respondents' Education Background Distribution	105
6. Survey Results of Awareness of Time, Cost and Quality	107
7. Cross-tabulation Analysis between Respondent's Years in Service and Time, Cost and Quality	108
8. Survey Results on Acceptability of PM	109
9. Cross-tabulation Analysis between Architect's Position and Architect's Reduced Role	112
10. Cross-tabulation Analysis between Architect's Position and PM Services are unnecessary	113
11. Survey Results on PM Characteristics	115
12. PM Drawbacks and its Applicability in the Design Practice	120
13. Cross-tabulation Analysis between Architect's Position and PM Setting Unrealistic Design Deadlines	122
14. Cross-tabulation Analysis between Architect's Position and PM Pressure on Shortening Design Time	124
15. Cross-tabulation Analysis between Architect's Position and Project Managers Having No Relevant Experience	125
16. PM Principle of Putting it Down in Words	128
17. PM Focus on Setting Time and Cost	130
18. PM Sets Quality Standards in the Current Architectural Design Practice	132
19. Cross-tabulation Analysis between Architect's Position and Design Reviews	133
20. PM Constantly Checking and Monitoring Design Development Status	135

21.	Implementation of PM Requires Changes to Organization Structure	137
22.	Cross-tabulation Analysis between the Architect's Years of Service and the Formation of New Divisions	138
23.	Future of Architectural Design Practice in the Public Sector	139
24.	Pearson Correlation Analysis	142

LIST OF FIGURES

Figure	Page
1. Chronological Vertical Sequence Model	49
2. Horizontal Sequence Model	49
3. Total System View of a Project in PWD	69
4. An Overview of Design Process and Procedures	72
5. Flowchart of Research Process in Sequence	87
6. Respondents Age Group	100
7. Respondents Gender Ratio	101
8. Respondents Seniority Ranking	102
9. Number of Years in Service in the Public Sector	103
10. Education Background of the Architects	106
11. PM has Increased the Awareness of Time, Cost and Quality	107
12. PM has Reduced the Role of an Architects	111
13. PM Services is Unnecessary, as Architects are Capable of Achieving Time, Cost and Quality	111
14. PM has Clear Goals and Written Objectives	116
15. PM Concentrate on Planning	116
16. PM Relies on Tools and Techniques	117
17. PM Sets Performance Requirement	118
18. PM Setting Unrealistic Design Deadlines	121
19. Constant Pressure on Shortening Design Time	123
20. Most Project Managers Do Not Have the Relevant Experience	123
21. PM is another Management Hurdle and Delaying Unnecessarily the Project	126

LIST OF APPENDICES

Appendix A	Organization Chart of PWD of Malaysia	169
Appendix B	Survey Questionnaire	170
Appendix C	Pearson Correlation Analysis Output	172

LIST OF ABBREVIATIONS

A	Agree
BPM	Building Project Management
CPM	Critical Path Method
CIOB	Chartered Institute of Builders
D	Disagree
DK	Do Not Know
GERT	Graphic Evaluation and Review Technique
MS-ISO	Malaysia Standards – International Organization for Standardizations
IT	Information Technology
LESS	Least Cost Estimating and Scheduling
MBO	Management By Objectives
QMS	Quality Management System
PACE	Program Analysis Control and Evaluation
PDM	Precedence Diagramming Method
PERT	Project Evaluation Report Technique
PEP	Project Evaluation Procedures
PM	Project Management
PMI	Project Management Institute
PWD	Public Works Department
SA	Strongly Agree
SD	Strongly Disagree
SPSS	Statistical Package for Social Science

CHAPTER 1

INTRODUCTION

1.1 Background

1.1.1 Rationale of the Study

The study is primarily focused on the project management practices adopted in the Public Sector's Architectural Design Practice in Malaysia. A good project management practice at the design stage may save millions of dollars and improve the chances of completing ahead of schedule. Poor management in the design phase causes unnecessary delays and incur expensive losses. Despite all these adverse effects of poor management, there is very little studies carried out locally to explore how building projects are managed at design phase. According to Ghaleb & Hisham (2000), the planning phase is considered as the most time consuming phase and at the same time is the most rewarding one if done properly.

The public sector construction projects are important to any country developed or developing because it provides the basic amenities in terms of housing, transportation and infrastructure development that will compliment the economic growth of the nation. While most government organizations are concerned with the end products of construction they tend to overlook the process of managing design stage of a building project. If the process can be improved, there will be enormous savings in cost that will result in quality product within time and budget.



The Public Works Department of Malaysia was chosen for the study mainly because the department is an implementation agency responsible for providing infrastructure and public utilities specifically roads, water supplies, government department buildings, airports, and jetties to meet the needs of the national development (PWD, 2001).

The Director General of Public Works Department of Malaysia commented that several measures taken by the Public Works Department to increase efficiency has resulted in a reduction of delayed construction projects (Star, 2000). However, the government is aware that there are still weaknesses in the PWD 's project implementation, for example in the areas of contract management, finalizing accounts and failure to meet the construction quality demanded by customers.

In the Seventh Malaysia Plan, the department was entrusted to develop approximately 12.2 billion ringgits worth of buildings, totaling to 5,144 government building projects (PWD, 2000). According to the PWD' s Building Branch Performance report dated September 2000 indicated that only 69 projects were not tendered within the five-year plan of the Seventh Malaysia Plan. Among the projects implemented about 252 projects were considered contract overruns. However the department's building division's performance report shows that expenditure performance stands at 73.7% or 10.329 billion ringgit of the allocated funds were used up under the Seventh Malaysia Plan (PWD Expenditure, 2000). The Department had implemented since late 1999, between 10 to 15 new revised procedures to ensure greater

efficiency. Thus this has resulted in fewer project overruns comparatively to previous years (Star, 2000).

1.1.2 Project Management Rationale

In the last thirty years there has been a tidal wave of interest in project management as a management philosophy to use in dealing with the many ad hoc activities found in contemporary organizations. Cleland & Roland (1994), points out that project management is recognized as a principal strategy and process to deal with the inevitable change facing organizations. The social, political, economic, technological, and competitive changes underway in the global marketplace require that any organization wishing to survive in face of such change needs to understand how such change can be managed.

As such the content of this research work will point out that architectural practice now have a special opportunity to bring new knowledge into the profession, especially seeking beneficial models of management to its needs. These models of project management must be sufficiently robust to accommodate issues in the architectural design profession, be it in the public or private practice. There are dangers in simply applying traditional management principles to the phenomenon of design. It requires a different kind of architectural activity, one that involves managerial approach that can transcend the formality and limitations of structured rule-systems. Thus a contemporary architectural design practice need to become more adaptive and need to find ways to tap into newly

emerging innovative project management principles as what other participants in the building process do.

The federal governments are no stranger to project management applications. After all, it was the U.S. Navy in the late 1950s that pioneered the network diagramming approach for planning, scheduling, and controlling projects (Spinner, 1997).

The quality of design has, undoubtedly, an extensive impact on all subsequent stages of a project's life cycle. Producing a quality design is highly dependent upon effective coordination among many teams, including the architectural, structural, electrical, and mechanical. However there are limitations and even drawbacks, particularly the time required to complete construction of public projects is frequently greater than the time specified in the contracts. The overruns are due to many reasons such as vague project briefs by the clients, design changes, or errors, user changes, incompetent contractors' time management weaknesses, and late deliveries. Despite the necessity for this research, little work has been done and described in literature concerning public sector's building projects (Al-Momani, 2000).

Ghaleb and Hashim (2000), points out that in developing countries the implementation of project management techniques and tools are still in its early phases of development. Besides this, several social, cultural, political and financial problems leads to poor management performance. In another related research work (Chalabi & Camp 1984), the findings points

out that projects delays in developing countries are during planning and construction stages. Hence, delays and cost overruns of construction project are dependent entirely on the very early stages of the project lifecycle.

The existence of different social, cultural, political and financial problems in developing countries has prompted the researcher to examine the project management principles adopted in the public sector's building projects in Malaysia, even though there were other related studies done in other developing countries. Therefore, the strategy for implementing project management in developing countries must be consistent with cultural and characteristics of the particular society and configuration of its economic, political and administrative system (Ghaleb and Hashim, 2000).

1.2 Research Objectives

The goal of this study is to investigate the relevancy of project management phenomena, its fundamental principles in practice in the public sector's architectural organization. The aim of the study is also to ascertain how the fundamental principles of project management are applied and adopted for the public sector's architectural practice. Thus, the study is intended to investigate the adoptability and relevancy of project management principles in the public sector's architectural design practice.