A PROJECT MANAGEMENT IMPLEMENTATION STRATEGY

FOR PUBLIC SECTOR CONSTRUCTION ACTIVITIES

by

LOUIS PETRUS KRÜGER

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PREFACE

At this point in my educational journey I wish to convey my sincere gratitude to three groups of people. The first group consists of the several academic members of staff of the Graduate School of Management, University of Pretoria, with whom I have had contact over a period of ten years. Among these I am especially indebted to my promoter, Professor P G Steyn and Professors R Erwee and A Boshoff, who were responsible for my other two subjects: organizational behaviour and research methodology, respectively.

The second group includes my family and friends. Here I wish to dedicate this effort to the loving memory of my late father, Benjamin Jacob Krüger and further to convey my sincere gratitude to my wife, Ichte, my mother and brother, and my friend, Japie for their patience and continued encouragement.

The third group are the dedicated individuals who helped me to refine and finalize this thesis: Cas Coetzee, for his assistance in the compilation of the questionnaire and later statistical analysis of the results, Andrè Marais, for the overall outlay and final appearance, and Iauma Cooper for editing and proofreading the thesis.

Finally I am grateful to my Creator, almighty God who inspired and motivated me to start and complete this project.

L P KRüGER
Vienna, 19 July 1994

ABSTRACT: SUMMARY
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LOUIS PETRUS KRÜGER

PROMOTER : PROFESSOR P G STEYN

DEPARTMENT : GRADUATE SCHOOL OF MANAGEMENT

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The research focuses on the implementation of project management in South African public sector work departments. These departments are typically responsible for managing the construction activities whereby building accommodation is provided for rendering collective services such as health and education.

The theoretical basis of the research stems from the earlier work of Schellenberg (1983) who suggested that strategy formulation and implementation be viewed from both content and process school perspectives. The content-related issues of the formulation and implementation of a strategy for project management were examined through the use of a force field analysis, as utilized elsewhere by both Nicholas (1990) and Kerzner (1992). The process-related issues of formulating and implementing a strategy for project management were examined through the application of the Connor and Lake (1988) general change management model.

The research strategy involved the use of a questionnaire comprising five parts

namely, A: the general classification of the respondents, B: the general orientation of respondents to project management, C: the management of organizational change, D: a force field analysis of the success driving and restraining factors in the implementation of project management, and E: a theoretical assessment of the chances of successfully implementing project management. All results were analyzed first for the respondents as a whole, secondly for the different managerial levels (top-level, middle and lower management), and thirdly for the different application groups (formal, informal and no project management).

While it was found that formal project management was already being applied in a large proportion of work departments, the results of the research could be of benefit to the work departments where informal project management is applied or where no project management is currently being applied.

SAMEVATTING: OPSOMMING
'N IMPLEMENTERINGSTRATEGIE VIR PROJEKBESTUUR BY OPENBARE SEKTOR KONSTRUKSIE-AKTIWITEITE

deur

LOUIS PETRUS KRÜGER

PROMOTOR : PROFESSOR P G STEYN

DEPARTEMENT : NAGRAADSE BESTUURSKOOL

GRAAD : DOKTOR IN BEDRYFSADMINISTRASIE

Die navorsing fokuseer op die implementering van projekbestuur by Suid-Afrikaanse openbare sektor werkedepartemente. Hierdie departemente is normaalweg verantwoordelik vir die bestuur van die konstruksie-aktiwiteite waardeur gebou-akkommodasie vir sekere kollektiewe dienste soos gesondheid en onderwys daargestel word.

Die teoretiese basis vir die navorsing spruit voort uit die vroeër werk van Schellenberg (1983), wie aanbeveel het dat strategieformulering en -implementering vanuit beide inhouds- en prosesskoolperspektiewe beskou word. Die inhoudsverwante aspekte vir die formulering en implementering van projekbestuur is ondersoek deur gebruik te maak van 'n kragveldanalise soos elders aangewend deur beide Nicholas (1990) en Kerzner (1992). Die prosesverwante aspekte vir die formulering en implementering van projekbestuur is ondersoek deur die algemene veranderingsbestuursmodel van Connor en Lake (1988) toe te pas.

Die navorsingstrategie het die gebruik van 'n vraelys behels wat uit vyf dele bestaan het, naamlik A: die algemene klassifikasie van respondente, B: die algemene oriëntasie van respondente teenoor projekbestuur, C: die bestuur van organisatoriese verandering, D: 'n kragveldanalise vir die suksesdrywende en verhinderingsfaktore vir projekbestuur implementering, en E: 'n teoretiese waardering van die kanse om projekbestuur suksesvol te implementeer. Al die resultate is geanaliseer vir eers die totale aantal respondente, tweedens, vir die verskillende bestuursvlakke (top-, middel- en laevlakbestuur), en derdens vir die verskillende toepassingsgroepe (formele, informele en geen projekbestuur).

Alhoewel dit bevind is dat formele projekbestuur alreeds by 'n groot aantal werkedepartemente toegepas word, kan die resultate van die navorsing van waarde wees vir werkedepartemente waar projekbestuur tans informeel of dan glad nie toegepas word nie.

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

CHAPTER 2

LITERATURE REVIEW

CHAPTER 3

RESEARCH PROBLEM AND METHODOLOGY

CHAPTER 4

RESEARCH RESULTS

CHAPTER 5

DISCUSSION OF THE RESEARCH RESULTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER 1

INTRODUCTION

1.1 MACROPERSPECTIVE

As in other countries of the international community, the Republic of South Africa (RSA) needs to respond proactively and adapt to the continuous changes that occur as a result of numerous dynamic macro-environmental forces.

By reason of the interaction that occurs between the different subenvironments which collectively make up the macro-environment, a change in the prevailing conditions of one subenvironment (for example, the political subenvironment) may have a direct or indirect influence on all or only on some of the other subenvironments. These other subenvironments include the economic, social/welfare, institutional, technological and physical environments.

The subenvironment in the RSA which is currently undergoing and also expected to further undergo dramatic changes in the immediate future is the political subenvironment. Awarding full and equal political rights to all members of the population will necessarily evoke major changes in some of the previously mentioned subenvironments. For example, it can reasonably be foreseen that the need and demand for social services such as health, housing and education will increase dramatically due to the expected changed priorities in the social/welfare arena. A situation could then arise where the current backlog between the demand for and supply of certain collective services will increase further.

The above difference between the unlimited needs (or demand for services) and the limited resources available by which the needs must be satisfied (or supply of services) is typically regarded from a macro-economic perspective as a problem of scarcity (Lombaard & Stadler, 1978: 3). If it was assumed that all resources were utilized in an optimal fashion, choices would then have to be made between competing needs by means of prioritizing. The extent to which needs are satisfied as measured by the real Gross Domestic Product (GDP) serves as a yardstick for the extent of the economic wealth for a given country (Lombaard et al, 1978: 21). Because the real economic growth rate for South Africa was lower than the population growth rate during the last decade, it can merely be accepted from this macro-economic perspective that, apart from the reduction in economic wealth per capita, the difference between the demand and supply of certain collective services had to increase. It is also expected that this negative trend of increased backlogs will be maintained in the foreseeable future.

In South Africa the public sector is responsible for rendering certain collective services such as health, education and national defense. Because of the nature of these services (such as the inseparableness of the services and the joint advantages that all members of the population receive), they are normally provided by an institution outside the free market place (Lombaard et al, 1978: 12). These services are financed by direct and indirect taxation which the State collects from the members of the population.

Given the above scenario, the dilemma faced by the institutions of the public sector, is the challenge to meet the increased demand for collective services with resources which do not increase at a comparable rate and are, in fact, actually expected to increase by a lower rate. In conjunction with this problem, the economic wealth or real GDP per capita of the

population should be maintained and preferably be increased without the increase in the tax burden (which by itself may place a further constraint on economic growth).

In order to render collective services, different resources, such as labour, capital, materials, machines and equipment, are needed. Physical facilities which come to mind are for example, classrooms or university lecture halls for education and hospitals or clinics for health services. As an integral part of the public sector's responsibility to render these collective services, the need therefore arises for the provision of such physical facilities. Due to the complexity of this function, the construction activities undertaken to provide the physical facilities are centralized and are managed by work departments or administrations (note that these terms are used interchangeably hereafter).

It should be clear at this point, that the rendering of collective services and more specifically, the provision of physical facilities or building accommodation by public sector work departments should occur within the framework of the limitations imposed by the current and projected changes in the subenvironments of the macro-environment. Possible solutions or strategies for effectively and efficiently handling these matters or the complex problems which may result from them, should consider these ever-changing environmental forces.

Against this macro-perspective introduction it is now possible for this introductional discussion to progress to a more specific microlevel in order to introduce the specific research question.

1.2 MICROPERSPECTIVE

Kerzner (1992: 1) in his opening remarks on the role and importance of project management asserts:

> "Almost all of today's executives are in agreement that the solution to the majority of corporate problems involves obtaining better control and use of existing corporate resources. Emphasis is being placed on looking internally rather than externally for the solution to these problems."

Given the need to remove or at least considerably narrow the difference between the demand for collective services (and also the accompanying physical facilities or building accommodation needed for the actual rendering of the services) and the shortage or lack of sufficient resources, it may be argued that a solution or strategy is needed whereby the existing available and realistically projected future resources are more effectively and efficiently utilized.

Project management focuses on the management of projects. The Project Management Institute (PMI) (1987: 4-1) defines project management as:

> " ... the art of directing and coordinating human and material resources throughout the life of a project by using modern management techniques to achieve predetermined objectives of scope, cost, time and participant satisfaction."

Although many of the basic principles through which project management has evolved are certainly as old as humankind itself (Kharbanda, Stallworthy & Williams, 1980: 3), project management as a management philosophy for projects only really crystallized during the late fifties of this

century (Harrison, 1985: 1). The reason for this can probably best be found in that changing international macro-environments make a global resource scarcity a practical reality, and this demands the efficient utilization of all available resources.

Where identifiable projects, such as the construction of hospitals or schools, are undertaken, this problem of scarcity of resources has made the development of a management approach which can effectively deal with and efficiently utilize existing resources an absolute necessity.

Against this macro- and microperspective introduction, it may thus be argued that, should project management as a formal policy be implemented in public sector work departments (who ultimately bear the responsibility for the projects by which construction activities are undertaken in order to provide the physical facilities needed for the rendering of the collective services), this strategy could contribute significantly towards the elimination of the differences between the existing and projected future demand and supply of such services. With reference to Kerzner (1992: 1), this strategy would thus entail an internal rather than an external solution. For practical reasons, external solutions, such as providing additional resources by increased taxation or further international loans or merely shifting the responsibility for the rendering of these collective services onto the shoulders of the private sector, should only be considered once all other internal solutions have been exhausted.

Figure 1.1 illustrates some of the macro- and microconsiderations that have been highlighted up to this point.

Figure 1.1: Macro- and microperspectives of the research

FOREIGN COUNTRIES	REPUBLIC OF SOUTH AFRICA		
		MACROENVIRONMENT (subenvironments)	MARKET ENVIRONMENT (submarkets)
	I N T E R N A T I O N A L	**POLITICAL**	CONSUMER GOODS AND SERVICES
		ECONOMICAL	INTERMEDIATE GOODS AND SERVICES
		SOCIAL/WELFARE	**CAPITAL GOODS AND FACILITIES**
		INSTITUTIONAL	PRODUCTION FACTORS
		TECHNOLOGICAL	Natural resources Labour
		PHYSICAL	Capital Entrepreneurship Information

DEMAND	DIFFERENCE + / -	SUPPLY

THE COMMUNITY NEEDS

PARTICIPANTS (subject groups)	
PRIVATE HOUSEHOLDS	PRIVATE SECTOR
BUSINESSES/ENTERPRISES	
STATE/GOVERNMENT	**PUBLIC SECTOR**

are responsible for rendering

COLLECTIVE SERVICES

Figure 1.1: continued

PROJECTS
PROJECT LIFE CYCLE
conceptual phase
planning phase
construction phase
operational phase
divestment phase

which are embraced in

CONSTRUCTION ACTIVITIES	
BUILDING WORKS	ENGINEERING WORKS
schools	roads and bridges
colleges	dams and tunnels
universities	electricity supply
hospitals	water and sewerage
clinics	other services

the provision of physical facilities leads to

RESOURCES AND FACILITIES
human labour
capital
machines
equipment
physical facilities

renders these services required

projects are carried out by

TRADITIONAL APPROACHES
PROJECT MANAGEMENT

which focuses on

PROJECT OBJECTIVES
cost
time
quality
participant satisfaction

and requires a

PROJECT MANAGER	INTERNAL (within organization)
managerial tasks	EXTERNAL (outside consultants)
planning	
scheduling	
organizing	
leading	
control	

1.3 PURPOSE AND OBJECTIVES OF THE RESEARCH

The purpose of the research is to develop general guidelines on an implementation strategy for both the effective and efficient application of formalized project management in public sector work departments or administrations. The work departments under consideration are those responsible for managing the construction activities by which physical facilities, which are needed for rendering collective services, are provided.

In order to achieve the purpose of the research, it is necessary to formulate specific, verifiable research objectives. The research objectives are to:

- Identify success-driving and success-barrier factors (or forces) which would either positively or negatively contribute to the implementation of formalized project management in public sector work departments involved in construction activities.

- Classify these factors into categories of philosophical (related to the principal requirements for implementation), situational (related to the practical conditions in which the departments operate), organizational (related to the internal characteristics of the departments), job-dimensional (related to the different roles/responsibilities of personnel within the departments) and human-oriented (related to the characteristics of individuals or groups who work in the departments).

- Evaluate these factors in terms of their relative strength and importance in three categories public sector work departments: (1) where project management is already applied as a formal policy (2) where project management is applied informally and (3) where project management is not applied formally or informally; and, in addition, to evaluate the factors in terms of the three basic managerial levels,

namely (1) top-level management (2) middle management and (3) functional or lower-level management.

- Assess the theoretical probability whether an implementation strategy, based on the results obtained from the respondents, could contribute significantly to both the effective and efficient formal application of project management in public sector work departments involved in construction activities.

1.4 STATEMENT OF THE RESEARCH QUESTION

The research question is:

> How can project management as formal policy be implemented effectively and efficiently in public sector work departments involved in the construction activities by which building accommodation is provided for the rendering of collective services?

1.5 DELINEATION OF THE RESEARCH

The research is limited to the following:

- A literature review of the main constructs found in the research namely, implementation strategies, project management and the management of organizational change.

- An empirical study of the extent to which formalized project management is currently applied by work departments of the public sector by way of the identification, classification and evaluation of the variables contingent upon such an application.

- An empirical assessment of the theoretical probability that an implementation strategy, based on the results obtained from the respondents, could contribute significantly to both the effective and efficient formal application of project management in public sector work departments involved in construction activities.

1.6 SIGNIFICANCE OF THE RESEARCH

The primary contribution of this thesis is seen as the empirical identification of the factors (variables) on which the successful implementation of project management as formal policy depends when applied to the construction activities of the public sector. Furthermore, the factors are classified into five categories and evaluated in terms of their relative strength and importance for developing general guidelines on an implementation strategy for formalized project management in the public sector.

The theoretical probability of the implementation strategy based on the results from respondents is also assessed empirically in terms of its potential to contribute significantly to both the effective and efficient formal application of project management in public sector work departments involved in construction activities.

The research is of general importance because it is based on a perceived valid research question and further could expand the existing body of knowledge of project management, specifically with regard to implementation considerations in a public sector setting. Should the results of the research facilitate the implementation of formalized project management in the public sector, this study may in a broad sense, then, also contribute to the elimination of the current and future projected backlogs of collective services. Provided the findings are generalizeable, they could also be applied to other project-related activities of the public sector.

1.7 PLAN OF THE THESIS

The plan of the thesis, presented in Figure 1.2, contains the following chapters:

Figure 1.2: Plan of the thesis

CHAPTER	STRUCTURAL COMPONENT	PURPOSE OF THE STRUCTURAL COMPONENT
1	INTRODUCTION	Background to research question, purpose, objectives, delineation and significance of the research
2	LITERATURE REVIEW	Literature review of the major constructs in the research
3	RESEARCH PROBLEM AND METHODOLOGY	Research problem, methodology and research design
4	RESEARCH RESULTS	Presentation of the results
5	DISCUSSION OF THE RESEARCH RESULTS	Discussion of the major findings of the research
6	FINAL CONCLUSIONS AND RECOMMENDATIONS	Final conclusions and recommendations of the research

Chapter 1 provides both a macro- and microperspective introduction to the research question in order to obtain a suitable perspective for the statement of the purpose, objectives and perceived significance of the research.

Chapter 2 describes the literature as applicable to the major constructs relevant in the research. These are implementation strategies, project management and the management of organizational change.

Chapter 3 states the specific research question and presents the research methodology and design. Information about the research population and data collection procedures is also included.

Chapter 4 outlines the results of the empirical investigation.

Chapter 5 presents a discussion of the results and their implications with regard to the literature and the underlying theoretical framework.

Chapter 6 summarizes the investigation and discusses the main findings of the study critically. Finally, recommendations are also made for future research.

1.8 CHAPTER SUMMARY

This introductory chapter presented both a macro- and a microperspective of the general events and conditions leading to the formulation of the research question. The introduction thus served as a general reference point for the statement of the purpose and verifiable objectives of the research. The purpose of the research is to develop general guidelines on an implementation strategy for the application of formalized project management in public sector departments involved in construction activities whereby building accommodation is provided.

A brief statement of the research question was then presented together with the delineation of the research. The research is limited to the identification, classification and evaluation of variables which will either facilitate

or restrain the implementation of formalized project management in public sector work departments. It is also limited to the assessment of the theoretical probability and potential that an implementation strategy, based on the results obtained from respondents, could contribute significantly to both the effective and efficient application of formalized project management in public sector work departments.

The perceived significance of the research was broadly substantiated and finally, a plan was presented detailing the structure and summarized content of the subsequent chapters of the thesis.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

The research is primarily focused on an aspect of project management. In this regard, the implementation of formalized project management is the subject of further investigation. The examination is limited to public sector work departments responsible for the construction activities by which building accommodation is provided.

The literature review commences in section 2.2 where the construct of an implementation strategy is examined. This section further provides the general analytical framework for the delineation of the literature review.

Section 2.3 reviews the relevant project management literature. The purpose is to gain an understanding of the content of formalized project management.

Implementing a strategy requires change. Literature related to the management of organizational change is thus reviewed in section 2.4. The purpose is to examine a general change management model for implementing formalized project management.

Where applicable, sections 2.3 and 2.4 include specific research propositions which are used as the basis for the development of the questionnaire for the empirical part of the research.

Finally, section 2.5 summarizes the literature review.

2.2 STRATEGY FORMULATION AND IMPLEMENTATION

2.2.1 Introduction

This first section of the literature review examines the construct of an implementation strategy.

Subsection 2.2.2 defines a strategy and presents the several dimensions and the different organizational levels through which strategic decisions may be characterized. A further focus point is the formulation and implementation of the strategy itself. Subsection 2.2.3 views strategy formulation from both a content and process school perspective. This distinction is also made to strategy implementation, which is presented in subsection 2.2.4. These three subsections provide the general analytical framework for the remainder of the literature review. Subsection 2.2.5 provides a summary of section 2.2 of the literature review.

2.2.2 Definition of a strategy

While objectives or goals, in general, represent the end points toward which all organizational activities are aimed (Koontz, O'Donnell & Weihrich, 1988: 62), strategies reflect the large-scale, future-oriented plans to optimize the achievement of the objectives (Pearce & Robinson, 1985: 6).

Koontz et al (1988: 63) propose that the following three definitions of a strategy are indicative of the most common usages of the concept. Strategies are:

- General programs of action and deployment of resources to attain comprehensive objectives.

- The program of objectives of an organization and the acquisition, use, and disposition of resources.

- The determination of the basic long-term objectives of an organization and the adoption of courses of action and allocation of resources necessary to achieve these goals.

Two aspects appear central in these definitions of a strategy namely, (1) the focus on objectives and (2) the deployment of resources of the organization. With regard to this research, it is important to note that a strategy to implement formalized project management should be linked to the long-term objectives of the public sector work departments and further meet their resource constraints.

However, a strategy does not precisely detail all future deployments of human and nonhuman resources. Rather it provides a broad framework for managerial decisions related to the desired long-term position of the organization and its utilization of scarce organizational resources.

To better understand the concept of a strategy, Pearce et al (1985: 7-8) list the following dimensions of strategic decisions:

- Strategic decisions require the involvement of top-level management. These decisions overarch several areas of the organization's operations. At this level, there is the necessary perspective for understanding and anticipating the wide-ranging implications and ramifications of the decisions. Furthermore, top-level management have the power to authorize the resource allocation and deployment for implementation.

- Strategic decisions involve substantial resource deployment. Human

and nonhuman resources must either be redirected from internal sources or secured from outside the organization. In either case, the decisions commit the organization to numerous actions over a specific time period.

- Strategic decisions have a significant impact on the long-term position of the organization. The decisions may lock an organization into a particular position for an extended period of time.

- Strategic decisions are future-oriented. Through anticipation and forecast, emphasis is placed on developing projections that will enable the organization to select the most promising strategic position. A proactive and anticipatory stance should be adopted towards change.

- Strategic decisions have major multifunctional consequences. The decisions are coordinative and require the involvement of more than one functional department or division of the organization. Each of these areas will be affected by the allocation or reallocation of responsibilities and resources related to the decision.

- Strategic decisions necessitate considering the factors in the external environment of the organization. Organizations are open systems which impact and are impacted on by external conditions largely beyond their control.

With regard to this research, it is important to note that a strategic decision taken to implement formalized project management would (1) require the approval of top-level management (2) commit the departments to numerous actions which may also involve resource deployments (3) dictate the long-term position of the departments (4) demand a proactive and positive

stance to change (5) impact on more than one functional division in a department and (6) require departments to adapt to the external conditions largely beyond their sphere of influence.

Pearce et al (1985: 8-10) further identify three levels of a strategy and indicate the characteristics of strategic decisions at each of these levels. The levels are related to the three-tier decision-making hierarchy found in most organizations. The levels are:

- The first level, where top-level management are primarily responsible for the overall performance of the organization. They set the overall objectives and formulate the strategies that span the activities of the individual divisions or sections within the organization. The decisions at this level tend to be value-oriented, conceptual and less concrete than those at the other levels. The decisions are characterized by greater risk, cost, and impact potential on performance as well as by longer time horizons and greater need for flexibility. These consequences follow the far-reaching futuristic, innovative and predominant nature of top-level management strategies.

- The second level, where middle management are responsible for the translation of the general statements of direction and intent generated at toplevel into concrete, functional objectives and strategies for the individual divisions. The decision characteristics at this level fall between those of the toplevel and the next level, the functional level decisions.

- The third level, where functional or lower-level management are responsible for the implementation or execution of the strategic plans of the organization. They develop the annual objectives and specific short-term strategies. These decisions involve action-oriented

operational issues. The decisions are made periodically and lead directly to implementation of some part of the overall strategy formulated at the other higher levels. The functional decisions are more concrete, quantifiable, require less organizational-wide cooperation, are relatively short range, and involve low risk and modest costs because they are dependent on available resources.

With regard to this research, it is important to note that while top-level management may decide on a particular futuristic, far-reaching and innovative course of action for the organization (such as the implementation of formalized project management), the second and third levels of management would be responsible for the actual detailed formulation and successful implementation of the strategy.

The purpose of strategies is therefore to determine and communicate, through a system of major objectives and policies, a picture of what kind of an organization is envisioned and how it will be achieved (Koontz et al, 1988: 63). The **what** and **how** are key words that are relevant to both strategy formulation and strategy implementation.

2.2.3 Strategy formulation

Strategic management as defined by Pearce et al (1985: 6) is seen as the set of decisions and actions resulting in the formulation and implementation of strategies designed to achieve the objectives of an organization. The first component, strategy formulation is described in this subsection. The second component, strategy implementation will be described in subsection 2.2.4.

As part of her comprehensive research on the issues of strategy implementation, Schellenberg (1983: 19-21) notes that the focus of strategic

management research has almost entirely been on strategy formulation to the relative exclusion of strategy implementation. She contends that while the impact of correctly formulating strategies should not be diminished and accepts that a well-conceived strategy is necessary, it is, however, an insufficient condition for organizational success. The strategy must be accomplished (or implemented) before the full potential for the organization can be realized.

Schellenberg (1983: 23-24) proposes that strategy formulation be viewed from both content and process school perspectives. The content school perspective focuses on what the strategy of the organization is or should be. The process school, however, is concerned with how the strategy is formulated, such as by analyzing the strengths, weaknesses, opportunities and threats to determine the appropriate strategy for the organization. This process is also generally referred to as formulating.

2.2.4 Strategy implementation

Pearce et al (1985: 287) regard the implementation of the formulated strategy as the action phase of strategic management. The strategy must be translated into concrete action and the action then carefully implemented to ensure the achievement of the objectives of the organization.

Schellenberg (1983: 21) regards strategy implementation generally as an administrative task by which top-level management select various tools in order to convert the strategy into reality.

Analogous to the distinction between the content and process of strategy formulation, Schellenberg (1983: 24-28) suggests that strategy implementation also be viewed from content and process school perspectives.

As before, the content school perspective focuses on what the implementation is or what the specific design is for implementation. The design is the vehicle through which the strategy is translated into the organization and can further be seen as the physical reflection of the formulated strategy. The three most commonly identified tools for implementation are (1) the organizational configuration or formal structure (2) the administrative systems or processes, such as budgets, reward and information systems, and (3) the leadership characteristics which include top-level leadership, interpersonal behaviour, participation and commitment.

The process school perspective is again concerned with how the strategy is implemented. They consider (1) the cognitive processes of the individuals involved (2) the social and organizational processes which constrain the choice of structure and (3) the political processes by which power is used to influence the implementation. Organizational behaviour which deals with resistance to change, management-by-objectives (MBO), and personality characteristics, such as interpersonal trust and conflict resolution, is relevant. This process is generally referred to as implementing.

Schellenberg (1983: 6) further argues that a requisite element in both strategy formulation and implementation is the concept of congruence. In formulation, the strategy of the organization and its environment need to be matched for greatest performance while in implementation it requires congruence among the various administrative tools used to implement the strategy.

Both strategy formulation and implementation may thus be viewed from process and content perspectives. Table 2.1 illustrates this subdivision (Schellenberg, 1983: 24).

Table 2.1: Strategy formulation and implementation: content and process school perspectives

PERSPECTIVES:	CONTENT	PROCESS
STRATEGY FORMULATION	What the strategy is	How the strategy is formulated: *formulating*
STRATEGY IMPLEMENTATION	What the implementation is.	How the strategy is implemented: *implementing*

Source: Adapted from Schellenberg, D.S. 1983. *Issues in strategy implementation: the effect of congruence among strategy, structure, and managerial performance*. Indiana University, Graduate school of Business. University Microfilms International. Exhibit II. p. 24.

With regard to this research, it should be noted that the content-related issues of strategy formulation and implementation (or what the strategy is and what the tools for implementation are) are the subject of focus in section 2.3. Section 2.4 focuses on the process-related issues of strategy formulation and implementation (or how a strategy is formulated and how it is implemented).

Finally, Schellenberg (1983: 28, 30) identifies three main areas where further research on implementation issues are necessary:

- Recognizing that the tool for implementation which has received the

most attention is the organizational configuration, research should be done on the other tools such as administrative systems and leadership characteristics.

- The process of implementing should be delineated and distinguished from the content of implementation. Of importance are the steps and the criteria which top-level management follow and consider when deciding among the various tools of implementation.

- The factors which influence the process of implementing. These factors would generally fall into three groups, namely (1) the cognitive schema of individuals involved including their cognitive and motivational orientation (2) the power/political dependencies and (3) the contextual constraints, such as the current structure, systems, leadership, culture, and organizational resources, size and technology.

This research will include attention to several of these above-mentioned aspects listed by Schellenberg (1983).

2.2.5 Summary

This first section of the literature review examined the construct of an implementation strategy.

A strategy is seen as a general programme of action which specifies the long-term objectives of an organization and indicates the deployment of resources to attain such objectives. Strategic decisions comprise several dimensions, which indicates the importance, prerequisites and impact of these decisions.

The characteristics of strategic decisions differ at each level of the typical decision-making hierarchy. Top-level management may decide on a futuristic, wide-ranging course of action, but middle and functional management are deemed responsible for the actual formulation and successful implementation of the strategy.

Strategy formulation and implementation may be viewed from both content and process perspectives. The content perspective focuses on what the strategy is and what the tools for implementation are. The process perspective focuses on how a strategy is formulated and how the strategy is implemented.

While the emphasis of previous research was on strategy formulation issues, Schellenberg (1983) contends that, without implementing a carefully formulated strategy, the full impact for organizational success could never be realized.

Further research on the process-related issues of strategy formulation and implementation is seen as a priority. This would include evaluating the alternative tools for implementation, identifying selection criteria to ensure optimal congruence, and determining the factors that influence the process of implementing a strategy.

The next section, section 2.3, focuses on the content-related while section 2.4 focuses on the process-related issues of a strategy to implement formalized project management.

2.3 PROJECT MANAGEMENT

2.3.1 Introduction

Section 2.2 presented a content and a process perspective of both strategy formulation and implementation. This section focuses on the content-related issues of strategy formulation and implementation. The process-related issues will be examined in section 2.4.

With reference to the research, this section thus describes what is understood by formalized project management (i.e. the formulation of the strategy) and what the tools for the implementation of formalized project management are (i.e. the implementation of the strategy).

Nicholas (1990: 3) points out that humankind have been involved in project activities over an extended period of time. To illustrate this point, he recalls the building of the pyramids around 2500 years B.C. until today, the current planning which is under way for the NASA space station - Freedom.

Projects by themselves do not thus appear to be anything new. What is important, however, is that the nature of projects and the environment in which they are undertaken have changed dramatically over that time span. Nicholas (1990:9) identifies three prominent characteristics which distinguish modern society from earlier periods of history. These characteristics of complexity, interdependency and rapid, radical change demonstrate such differences in modern project environments.

Cleland and King (1983: 5-6) describe the challenges and problems of modern society as involving risk and uncertainty arising from many interacting forces and variables, rapidly changing technology, rising costs, increased competition, frequent resource shortages, and numerous interest

groups with their opposing views about the best course of action.

Although each project differs in its characteristics, all projects need to be managed in some way or other.

An approach to the management of projects which, while having evolved over time, has to a large extent only crystallized and been formalized over almost the last forty years (Tuman, 1993: 40), is project management. Based primarily on the systems approach to management, today project management is widely recognized by academicians and practitioners (Bennett, 1992: 9) as a distinct management approach for projects.

In this second section of the literature review, the discussion of formalized project management begins in subsection 2.3.2 with the definition of a project. The related concept of a project life cycle is illustrated in subsection 2.3.3. The need for management of projects is substantiated in subsection 2.3.4 and project management as an identifiable management approach for projects is defined in subsection 2.3.5. Subsection 2.3.6 focuses on the objectives of project management while subsection 2.3.7 identifies the main elements of project management. These main elements, which include the project manager (subsection 2.3.8), the project team (subsection 2.3.9) and the project management system itself (subsection 2.3.10) are then described in further detail. The functions of project management are identified in subsection 2.3.11 and the project environment is described in subsection 2.3.12. Having established a foundation for an understanding of project management, successful project management is then defined in subsection 2.3.13. The applications and different forms of project management are presented in subsection 2.3.14 and finally, subsection 2.3.15 summarizes section 2.3 of the literature review.

2.3.2 Definition of a project

The focus of project management is on the management of projects. It is therefore suitable to first define what is understood by the concept of a "project".

To do so, the characteristics that warrant classifying an activity or range of activities as a project may be listed. Nicholas (1990: 3-4) in a summary of several authors' viewpoints proposes that the characteristics by which activities are classified as projects centre on their purpose, complexity, uniqueness, unfamiliarity, temporary nature and life cycle of the activity.

Kerzner (1992: 2) considers a project to be any series of activities and tasks that have a specific objective to be completed within certain specifications, have defined start and end dates, have funding limits and further consume resources.

The Project Management Institute (PMI) (1987: 4-3) defines a project as:

> "Any undertaking with a defined starting point and defined objectives by which completion is identified. In practice, most projects depend on finite or limited resources by which the objectives are to be accomplished."

Other characteristics of projects identified by Wideman (1991: I-1,2) include rarity, subject to the constraints of time, money and resources, multi-disciplinary, and the requirement of a dynamic response to external complexities and internal developments.

Project endeavours differ in the kind of efforts required. Using a diagram, Nicholas (1990: 5-6) listed examples of actual projects according to their

degree of complexity and uncertainty. Complexity was measured by the magnitude of effort, the number of groups and organizations that had to be coordinated, and the diversity in skills or expertise needed to accomplish the work. Uncertainty was measured by the difficulty in predicting the final outcome in terms of the dimensions of time, cost and technical performance. From this classification it was concluded that:

- Time and resource commitments tended to increase with the degree of complexity of the projects.

- Most projects had some uncertainty in one or two of the dimensions but the most complex projects displayed uncertainty in all three dimensions.

- Projects that were very similar to other previous endeavours had lower uncertainty by reason of the learning curve concept.

- When the uncertainty of a project approached near zero and it was further repeated a large number of times, the effort was no longer considered to be a project.

For the purposes of this research, the following summary of the concept "project" will suffice:

- Projects are considered to be any series of temporary, non-routine, non-repetitive and unique activities which are undertaken to accomplish specific, definable objectives stated in terms of time, cost and performance requirements.

- Projects differ in their characteristics as reflected in their complexity (expressed by the unfamiliarity, magnitude and diversity of effort) and

uncertainty (expressed by the difficulty in predicting the measure of success of the final outcome).

- Projects consume limited or finite resources.

- Projects may require the contributing efforts of more than one organization and utilize multidisciplinary skills, talents and expertise which have to be coordinated across organizational boundaries.

- Projects require a dynamic response towards both internal developments and external complexities.

- Projects differ from continuous/repetitive and job/job-lot operational systems.

- Projects need to be both effectively and efficiently managed.

Proposition 1:
A success factor in the implementation of formalized project management is the participation in project-type work as an integral part of normal activities.

Proposition 2:
A success factor in the implementation of formalized project management is the involvement with projects which exhibit a high degree of complexity and uncertainty.

2.3.3 Project life cycle

An integral part of a project is its life cycle. The PMI (1987: 4-3) defines a project life cycle as:

> "The four sequential phases in time through which any project passes, namely: concept; development; execution (implementation or operation); and finishing (termination or close-out)."

Nicholas (1990: 91) suggests that all projects can be divided into some logical phases or stages to indicate the types of tasks or activities that are conducted within a period of time. His model divides a project into four phases identified as the conception, definition, acquisition, and operation phases. Each phase has specific content and management approaches. He further notes that the number of phases and details for each are a matter of judgment and differ for each project, though the sequence is similar for virtually all projects.

Kerzner (1992: 82) also remarks that there seems to be little agreement among industries or even organizations within the same industry about the exact breakdown of the life cycle phase of projects. This, he suggests, is due to the complex nature and diversity of projects. Kerzner (1992: 82-91) follows the theoretical definitions of the life cycle phase of a system as proposed by Cleland et al (1983) identified as conceptual, definition, production, operational and divestment.

Wideman (1991: III-1) notes that the selection of appropriate stages is typically specific to the industry concerned. He proposes an anatomy of the project life cycle (illustrated in figure 2.3.1) whereby from a macroview, the plan itself and the next level (a phase) are generic to all projects but, moving further down to a microview, the third level (stages) is industry

specific while the fourth level (activities/tasks) is project specific.

Figure 2.3.1: The anatomy of the project life cycle

	PLAN	NUMBER OF COMPONENTS	APPLICATION
MACROVIEW	PHASES	CONCEIVE DEVELOP EXECUTE FINISH	GENERIC
	STAGES	5 TO 10	INDUSTRY SPECIFIC
MICROVIEW	ACTIVITIES OR TASKS	MANY	PROJECT SPECIFIC

Source: Wideman, R.M. 1991. *A framework for project and program management integration*. The PMBOK handbook series - No. 1. Figure III.1. p. III-1.

With due recognition of the viewpoints of both Nicholas (1990) and Kerzner (1992), it would be sufficient for the purposes of this research to conclude that, in general, a project progresses through four successive life cycle phases in time as proposed in the definition of PMI. These phases as well as some of the typical project phase activities are shown in figure 2.3.2 (Wideman, 1991: III-2).

Finally, it should be noted that the appropriate and consistent application of management to all levels of the project life cycle is greatly enhanced by the division of a project into distinct phases. A standard approach may then be applied to the more manageable work packages.

Figure 2.3.2: Typical project life cycle and activities

TOTAL PROJECT LIFE CYCLE			
PLAN		**ACCOMPLISH**	
PHASE 1	PHASE 2	PHASE 3	PHASE 4
CONCEPT Conceive	**DEVELOPMENT** Develop	**IMPLEMENTATION** Execute	**TERMINATION** Finish
Gather data	Appoint key team members	Set up: - organization - communications	Finalize product(s)
Identify need	Conduct studies	Motivate team	Review and accept
Establish: - goals, objectives - basic economics, feasibility - stakeholders - risk level - strategy - potential team	Develop scope baseline: - end product(s) - quality standards - resources - activities	Detail technical requirements	Settle final accounts
Guesstimate resources	Establish: - master plan - budget, cash flow - WBS - policies/procedures	Establish: - work packages - detail schedule - information and control systems	Transfer product responsibility
Identify alternatives	Assess risks	Procure goods and services	Evaluate project
Present proposal	Confirm justification	Execute work packages	Document results
Obtain approval for next phase	Present project brief	Direct/monitor/ forecast/control: - scope - quality - time - cost	Release/redirect resources
	Obtain approval to proceed	Resolve problems	Reassign project team

Source: Wideman, R.M. 1991. *A framework for project and program management integration*. The PMBOK Handbook series - No. 1. Figure III.2a. p. III-2.

Proposition 3:
A success factor in the implementation of formalized project management is the division of a project into appropriate phases of development to promote the management of each successive life cycle phase.

2.3.4 The need for the management of projects

As stated in subsection 2.3.2, the focus of project management is on the management of projects. This subsection examines why projects need managing.

Nicholas (1990: 7) concludes that:

> "Although mankind has been involved in projects since the beginning of recorded history, obviously the nature and the environment have changed. ... To cope with new, more complex kinds of activities and greater uncertainty, new forms of project organization and new practices of management have evolved."

According to Wideman (1991: I-1):

> "Projects have always needed managing, yet many just limp along at a fraction of their potential simply because people don't know how to make them run any better."

As noted previously, projects by themselves are nothing new. So, too, the need for managing them also appears to be self evident. What is important, however, is the recognition that the projects which are undertaken in modern society necessitate a departure from the traditional management

approaches (Nicholas, 1990: 9).

Kerzner (1992: 3) lists some obstacles which the modern management of projects must overcome. These involve the project complexity, project risks, special requirements of customers, organizational restructuring, changes in technology and forward planning and pricing.

Cleland et al (1983: 4) argue that the solutions to problems imposed by the demands of rapid change and technological complexity must themselves be somewhat complex and adaptive to change. Nicholas (1990: 9) suggests that, in response to these different demands, new management approaches under the guise of the "systems approach" have become mandatory.

A modern method of management, which arose in response to the need for an approach which could deal with the problems and take advantage of the opportunities of modern society and is today being applied in a wide variety of industries and organizations, but which, according to Nicholas (1990: 8-9) unfortunately still lags far behind its potential, is project management.

Project management is a departure from the management of simpler ongoing, repetitive operations where the market and technology are more predictable, greater certainty exists about anticipated outcomes, and fewer parties or organizations are involved (Nicholas, 1990: 9). Wideman (1991: II-2,3) argues that the mere application of standard management principles to project-type work is invalid by reason of the precise definition of a project which highlights a dramatically different management environment. In support of his argument he contrasts some of the characteristics of a well-managed production or service organization with those of a project environment.

Wideman (1991: II-2,3) lists the characteristics of a well-managed production or service organization as follows:

- Roles and relationships are well understood, having been developed and adjusted over lengthy periods of time.

- Tasks are generally continuous, repetitive or exhibit substantial similarity.

- Relatively large quantities of goods or services are produced in a given time period.

- There is relative stability in the work environment. Change is minimal and protracted, and can be thoroughly programmed and progressively integrated.

- Management concern themselves with projects only on an exception basis.

This type of work environment is thus characterized by situations which are more predictable, less risky and stable, and can be efficiently handled by "mechanistic" organizational forms and management procedures (Nicholas, 1990: 9). The work places of such enterprises are bounded by traditional hierarchies, vertical lines of authority, centralized control and repetitive, assembly line-type jobs (Wideman, 1991: II-3).

A project environment by contrast, however, features the following (Wideman, 1991: II-3): temporary teamwork, informal relationships, complex management environment, specific time constraints, limited and/or shared resources, measurable progress against plans, and rapid change.

This type of work environment thus calls for adaptability and rapid response to change due to the volatile market environments and requires more "organic" forms of organizations and management procedures. These forms of organizations accommodate the need for high-level technical and managerial competence and considerably expand on the latitude and degree of decentralization in decision making (Nicholas, 1990: 9).

The sharp contrast in the nature of the activities between the different work environments for project and non-project work has been indicated. However, it must further be recognized that the achievement of specific objectives of a project entails a process. Wideman (1991: II-3) suggests that when project-type work is conducted through the traditional management approaches, these processes tend to break down. Consequently a new management philosophy, strategy and relationships are required. The new process entails project management and refers to the process of managing people within a project-oriented environment.

Proposition 4:
A success factor in the implementation of formalized project management is an adaptable organizational form with flexible management procedures which are capable of rapid response to change and also expand on the latitude and degree of decentralized decision making.

Proposition 5:
A success barrier factor for the implementation of formalized project management is the application of traditional management approaches (which call for vertical hierarchies, formal lines of authority, centralized control and are found in simpler ongoing, repetitive-type production and service organizations) to project-type work.

2.3.5 Definition of project management

A project as an identifiable undertaking of human organizations requires management. Nicholas (1990: 21) argues that, without some form of management, the objectives of projects could never be attained. Although the specific responsibilities of managers vary greatly, they all have the management role of integrating resources and tasks in order to achieve organizational goals (Nicholas, 1990: 21).

Kerzner (1992: 4) provides an overview definition of project management and states that:

> "Project management is the planning, organizing, directing, and controlling of company resources for a relatively short-term objective that has been established to complete specific goals and objectives. Furthermore, project management utilizes the systems approach to management by having functional personnel (the vertical hierarchy) assigned to a specific project (the horizontal hierarchy)."

Kerzner (1992: 5-6) further states that:

> " ... project management is designed to manage or control company resources on a given activity, within time, within cost, and within performance. Time, cost and performance are the constraints on the project. If the project is to be accomplished for an outside customer, then the project has a fourth constraint: good customer relations."

The PMI (1987: 4-1) defines project management as:

> " ... the art of directing and coordinating human and material resources throughout the life of a project by using modern management techniques to achieve predetermined objectives of scope, quality, time and cost, and participant satisfaction."

Two aspects in the definitions of project management presented above warrant further discussion, namely (1) the emergence of project management as a systems approach to management and (2) the general management functions of planning, organizing, directing/leading and control.

With regard to the first aspect, Koontz et al (1988: 37-50) list twelve identifiable approaches which historically record the study of management science and theory. Of these, the following approaches may be considered pillars which underpin the project management approach: the interpersonal behaviour, group behaviour, decision theory, contingency or situational, managerial roles and, finally, the systems approach.

Kerzner (1992: 238-239) suggests that there are generally five management school philosophies. He notes that functional managers tend to practise the first three schools of management whereas project managers utilize the last two. The management school philosophies identified are the classical/-traditional, empirical, behavioural, decision theory and the management systems school.

In a similar but condensed review of the evolving series of management propositions and methodologies, Nicholas (1990: 22-23) identifies four basic viewpoints: the classical, behavioural, systems and contingency viewpoints.

Although project management could be shown to include some aspects of the comprehensive list of management approaches identified by Koontz et al (1988), the generalized management school philosophies of Kerzner (1992) and the condensed management viewpoints identified by Nicholas (1990), it is primarily considered a systems approach to management (Kerzner, 1992: 4). The systems approach recognizes that organizations exist in a universe of forces, are comprised of interrelated units of which the goals and outputs are coordinated and integrated for the benefit of the organization as a whole (Nicholas, 1990: 9).

Proposition 6:
A success factor in the implementation of formalized project management is the application of the systems approach to management (which implies that a department is an open system which interacts with and is influenced by its external environment, it comprises separate units, each with individual goals which must be coordinated and integrated for the benefit of the department as a whole) to project-type work.

Referring back to the definitions of project management presented, the second aspect to be addressed is the general management functions of planning, organizing, directing/leading and control.

Koontz et al (1988: 2) identify the basic functions of management as planning, organizing, staffing, leading and controlling. Coordination is seen as the essence and purpose of management rather than a separate management function.

Kerzner (1992: 239) recognizes the trend of modern practitioners to still identify the responsibilities and skills of management in terms of the

principles and functions as listed by Koontz et al (1988). However, he argues that these management functions are generally applied to traditional management and should be redefined for temporary management positions. Their fundamental meanings remain the same but the applications differ.

Nicholas (1990: 21-22) classifies the activities of a manager into five functions - planning, organizing, leadership, control and change. The functions are redefined for temporary management positions as:

- Planning. It involves setting project goals and establishing means for achieving them consistent with available resources and the forces in the environment.

- Organizing. It involves deciding how the work will be accomplished. It includes (1) hiring, training and assembling people into a system of authority, responsibility and accountability relationships, (2) acquiring and allocating facilities, materials, capital, and other resources, and (3) creating an organizational structure that includes policies, procedures, reporting patterns and communication channels.

- Leadership. It involves directing and motivating people to attain objectives. It focuses on workers, groups and their relationships to influence work performance and behaviour.

- Control. It involves the evaluation of performance with respect to standards of efficiency and effectiveness and, where necessary, corrective action.

- Change. The other functions are performed to accomplish project goals. This function is implied by reason of the need for continual

assessment and change. Organizations are open systems whose goals and activities have to be adapted to accommodate the changing forces in the internal and external environments.

It should be noted that the different functions of management as proposed by Koontz et al (1988) - primarily from a general management viewpoint - and both Kerzner (1992) and Nicholas (1990) - from a project management viewpoint - seem to exhibit a great deal of similarity. The following differences are worth noting:

- Both Kerzner and Nicholas exclude the staffing function. Kerzner (1992:4) explains that staffing is a line responsibility and that the project manager may merely request specific resources. Some of the activities which form part of this function are, however, included in either their organizing or directing function, respectively.

- Kerzner uses the term "directing" while Koontz et al prefer the term "leading" and Nicholas "leadership". Leading or leadership, however, includes the process and activities of directing. Kerzner (1992: 240-241) lists the elements of directing as staffing, training, supervising, delegating, motivating, counselling and coordinating.

- Nicholas defines a further management function of change. This is in recognition of the fact that an organization is an open system. The other authors do not specifically regard change as a separate management function but elsewhere accept the dynamic interaction with both the internal and external environmental variables.

Proposition 7:
A success factor in the implementation of formalized project management is the managerial proficiency of project manager with regard to the general management functions of planning, organizing, leading/directing and control.

Nicholas (1990: 25-27) summarizes the characteristics which are embodied in project management as proposed by Cleland et al (1983) as follows:

- A single person, designated as the project manager, heads the project organization and operates independently of the normal chain-of-command. This organization reflects the cross-functional, goal-oriented, temporary nature of the project.

- The project manager is the single focal point for bringing all efforts together to achieve the single set of project objectives.

- Since each project requires a variety of skills and resources, the actual work might be performed by many functional areas or even other organizations.

- The project manager and project team are responsible for integrating people from different functional disciplines who are working on the project.

- The project manager negotiates directly with functional managers for support. Functional managers are responsible for individual work tasks and personnel within the project while the project manager is responsible for integrating and overseeing the start and completion of activities.

- A project might have two chains-of-command: one vertical (and functional) and one horizontal (and project). Personnel might report to both the project manager and a functional manager.

- The project focuses on delivering a particular product or service at a certain time and cost, and to the satisfaction of technical requirements. In contrast, functional units must maintain an ongoing pool of resources to support organizational goals.

- Decision making, accountability, outcomes, and rewards are shared among members of the project team and supporting functional units.

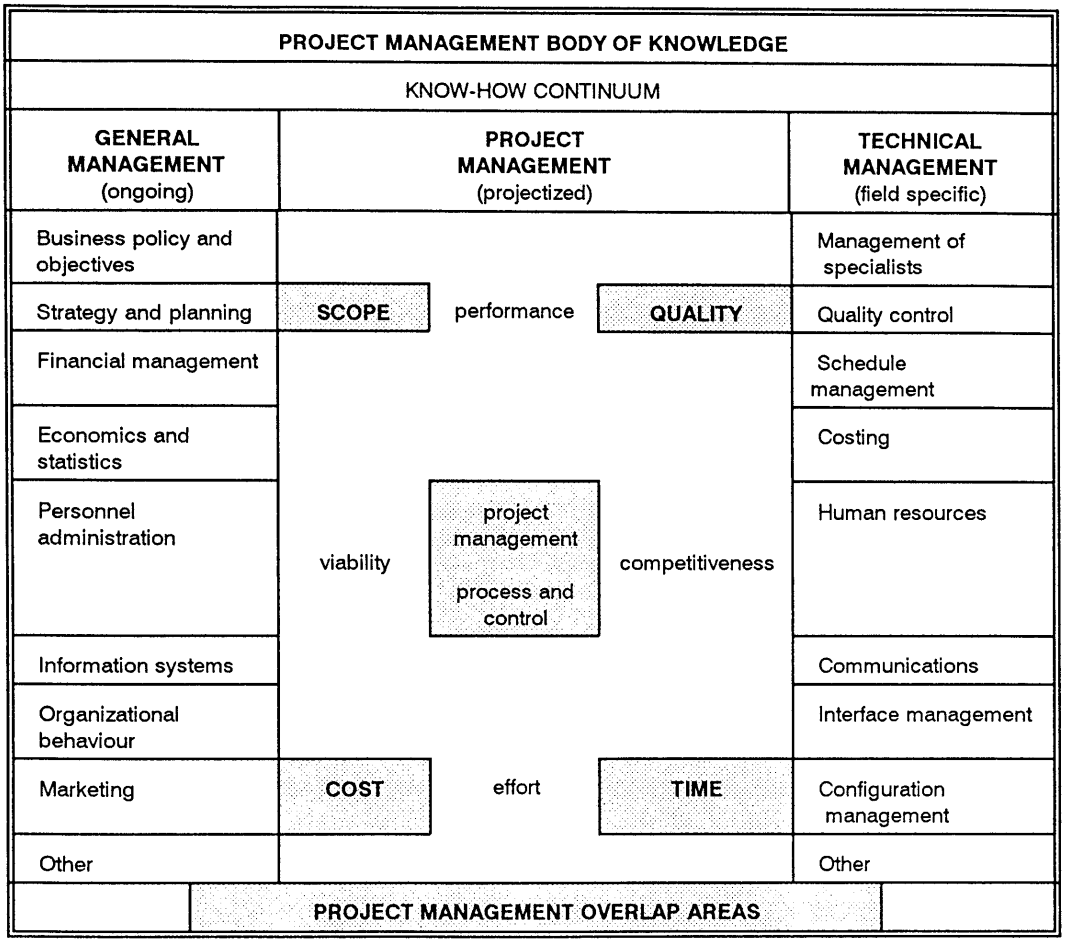
- Though the project organization is temporary, the functional units from which it is formed are permanent. When a projects ends, the project organization is disbanded and people return to their functional units or are reassigned to new projects.

Project management is today widely recognized and acknowledged as a distinct management approach for projects. The creation of an "own" or distinct body of knowledge for project management is illustrated in figure 2.3.3 (Wideman, 1987: 1-5).

For the purposes of this research, the following summary of the concept "project management" will suffice:

- For project objectives to be attained, projects need to be effectively and efficiently managed.

Figure 2.3.3: Project Management Body of Knowledge



Source: Wideman, R.M. 1987. The framework: part 1: the rationale. *Project management body of knowledge (PMBOK)*. Project Management Institute. Figure 3. p. 1-5.

- Project management is primarily based on the systems approach to management.

- Project management involves the management functions of planning, organizing, leading/directing and control.

- The essence of management purpose is seen as coordination.

- The characteristics of project management, in addition to the single definitions thereof, provide an insight into the detailed workings of this management approach for projects.

- Project management is viewed as a distinct management approach for projects with an identifiable own, distinct and unique body of knowledge.

- A general overview definition of formal project management, incorporating most aspects of different authors, could be:

  Project management as systems approach refers to the planning, organizing, leading, and controlling of human and material resources for the duration of a project which has been established in order to achieve and complete specific predetermined objectives of cost, time, performance and participant satisfaction.

2.3.6 Objectives of project management

Koontz et al (1988: 659) define an objective as the ends toward which an activity is aimed or the end points of planning. No distinction is made between either the term "objective" or "goal". An objective is verifiable if, at some target date in the future, it can be determined with certainty that the objective has been accomplished. These objectives may be expressed both quantitatively and/or qualitatively.

Kerzner (1992: 410) lists some general characteristics of project objectives. The project objectives must be specific (not general); not overly complex; measurable, tangible and verifiable; realistic and attainable, and established within resource boundaries; consistent with the available or anticipated resources; and consistent with the organizational plans, policies and

procedures.

Nicholas (1990: 9) identifies the goals of project management as having three dimensions. They are to accomplish the work in accordance with:

- **Budget**. The cost parameter, which is the specified or allowable cost for the project or target cost for the work to be done.

- **Schedule**. The time parameter, which includes the time period over which the work will be done and the target date when it will be completed.

- **Performance**. The technical or specification parameter, which specifies what is to be done to reach the end-item and includes the required features of the final product or service, technological specifications, quality and quantity measures.

Kerzner (1992: 5) refers to these goals as constraints. He also includes a fourth constraint, namely good customer relations, when projects are undertaken for an outside customer.

PMI (1987: 4-1) refers to the predetermined objectives of scope, cost, time, quality and participant satisfaction. The scope objective encompasses in general, the goals and objectives of the whole project. The meaning is similar to the concept of management-by-objectives or MBO. Koontz et al, 1988: 659 define MBO as a comprehensive managerial system that integrates many key activities in a systematic manner which is consciously directed toward the effective and efficient achievement of organizational and individual objectives.

Kerzner (1992: 411) suggests that many projects are directed and

controlled using such an MBO approach. He views the underlying philosophy of MBO as proactive rather than reactive; results-oriented emphasizing accomplishment; and focused on change to improve individual and organizational effectiveness.

Closely related to the objectives of project management is the notion of project success and successful project management. These are further described in section 2.3.13.

Proposition 8:
A success factor in the implementation of formalized project management is the statement of specific, verifiable and attainable project objectives in terms of budget (cost), schedule (time), performance (quality) and stakeholders' acceptance including the utilization of an MBO approach to achieve the scope objective of the project.

2.3.7 Main elements of project management

Nicholas (1990: 11-12) identifies three main elements or key features which distinguish project management from earlier, traditional forms of management. The main elements are:

- **The project manager** - whose single, overriding responsibility is to integrate the work efforts of all participating functional support areas to achieve the project goals. The project manager is accountable for the entire project and should be totally dedicated to achieving its goals.

- **The project team** - who are the individuals and groups brought

together to form a single, cohesive team working towards a common goal. Project work is teamwork because it is accomplished by a group of people, often from different functional areas and organizations, who participate whenever and wherever they are needed.

- **The project management system** - which comprises the organizational structure, information processing system, and the practices and procedures that permit the integration of vertical and horizontal elements of the project organization.

Kerzner (1979: 6-8) in similar fashion identifies two guiding factors which form the basis for the underlying principles behind project management, namely:

- The establishment of the project manager as the focal point for the integrative responsibility.

- The establishment of an integrated planning and control system for effective integration of the horizontal and vertical units of the organization.

The main elements of project management which will be described in the following three subsections, are based on the key features of project management as proposed by Nicholas (1990) and embodied in Kerzner's (1979) guiding factors. The main elements of project management thus defined are the project manager (2.3.8), the project team (2.3.9), and the project management system (2.3.10).

Proposition 9:
A success factor in the implementation of formalized project management is the embodiment of the three main elements of project management, namely (1) a project manager (2) a project team and (3) a project management system.

2.3.8 The project manager

2.3.8.1 The role of the project manager

Nicholas (1990: 172-173) argues that the role of the project manager is so central that, without it, there could not be project management. He identifies seven different roles (or dimensions to the role) which the project manager must fulfil:

- **Integrator**. The project manager's prime role is to integrate the diverse activities of scattered elements to achieve time, cost and performance objectives.

- **Communicator**. The project manager serves as the focal point for all reports, requests, memoranda and complaints. Between the sources and receivers of information, the project manager refines, summarizes and translates the information to make sure that all project contributors are well informed about the policies, objectives, budgets, schedules and changes.

- **Decision maker**. The project manager is in the central position to make critical decisions, such as the reallocation of resources, change of project scope or direction, and balancing schedule, cost and performance criteria.

- **Motivator**. The project manager instils a sense of direction and commitment to action. Motivating aspects associated with project-type work are spontaneity, achievement and excitement while infrequent contact, part-time personnel, diverse specialities and spatial distance between workers may reduce motivation.

- **"Evangelist"**. The project manager conveys the faith in the project, its value and workability.

- **Entrepreneur**. The project manager is driven to procure funds, facilities and people for the start and, ultimately, the completion of the project.

- **Change agent**. The project manager initiates passage to new and promising areas, strives to overcome resistance to change, and is ready to adopt new and innovative ideas.

In a contributing letter to PMI in Wideman (1991: V-2), Zuberi also elaborates on the different roles of the project manager. He identifies three main roles:

- **Interpersonal**. The project manager is the figurehead and performs the ceremonial duties on the project. Managing human interrelationships in the project organization is seen as part of the leadership role and the influence may extend beyond the project bounds to the organization's chain of command and also to outside parties.

- **Informational**. Through the information/communications function, the project manager must receive quality information from subordinates as well as from outside sources, thereby developing a powerful database of relevant information. The project manager also acts as

spokesperson in conveying information outside the project group, informing and influencing the decisions of top-level management who have organizational control over the project.

- **Decisional**. Information, experience and courage to decide with incomplete data provide the input to decision making. As the project team's decision maker, the project manager may be acting as the interpreter and communicator; resource allocator; the monitor; and the entrepreneur seeking ways to improve group performance in a changing environment.

Proposition 10:
A success factor in the implementation of formalized project management is the performance of a variety of roles by the project manager, such as that of integrator, communicator, decision maker, motivator and change agent.

2.3.8.2 The responsibilities of the project manager

Nicholas (1990: 173-175) suggests that the principal responsibility of the project manager is to deliver the project end-item within the budget and time limitations, in accordance with technical specifications and, when specified, in fulfilment of profit objectives. The other responsibilities vary, depending on the project manager's capabilities, the current stage of the project, the size and nature of the project, and the specific duties delegated by top-level management. These other responsibilities may include:

- The planning of project activities, tasks, and end results including the breakdown of work, scheduling and budgeting.

- Organizing, selecting and placing the project team as well as coordinating tasks and allocation of resources.

- Interfacing and negotiating with functional managers, contractors, consultants and top-level management.

- Monitoring the project status.

- Identifying technical and functional problems, solving these problems directly or finding solutions to the problems elsewhere.

- Dealing with crises and resolving conflicts.

- Managing termination or redirecting efforts when objectives cannot be achieved.

Kerzner (1992: 174,597) also lists the responsibilities of a project manager, and includes:

- To produce the end-item with the available resources and within the constraints of time, cost and performance/technology.

- To meet contractual profit objectives.

- To make all required decisions whether they be for alternatives or termination.

- To act as the customer (external) and top-level and functional management (internal) communications focal point.

- To define the goals, objectives, requirements, major milestones,

ground rules and assumptions, the time, cost and performance constraints, operating procedures, administrative policy and reporting requirements.

Proposition 11:
A success factor in the implementation of formalized project management is the project manager's principal responsibility to deliver the project end-item within the budget and time limitations, in accordance with technical specifications and, when applicable, in fulfilment of profit objectives.

2.3.8.3 The interface role of the project manager

For project managers to fulfil their responsibilities successfully, they are constantly required to demonstrate their skills in interface, resource (Wall, 1984: 30-31), and planning and control management (Kerzner, 1992: 175).

With reference to interface management, Kerzner (1992: 11) points out that, although everything seems to revolve around the project manager in a project environment, the project organization cannot exist apart from the traditional structure of the organization. The project manager must therefore interface with both top-level and functional management. This interface role generally entails:

- Managing human interrelationships in the project organization.
- Maintaining the balance between technical and managerial project functions.

The interface role between the project manager and functional manage-

ment can further be defined by the following relationships (Kerzner, 1992: 278,647):

- The project manager must determine: what is to be done; when the task will be done; why the task is done; how much funds are available; and how well the total project has been done.

- The functional manager must determine: who will do the task; where the task will be done; how the task will be done; and how well the functional input has been integrated into the project.

Proposition 12:
A success factor in the implementation of formalized project management is the interface role of the project manager with both top-level and functional management.

2.3.8.4 The authority of the project manager

Kerzner (1992: 106) defines authority, responsibility and accountability as follows:

- **Authority** is the power granted to individuals to make final decisions for others to follow.

- **Responsibility** is the obligation incurred by individuals in their different roles in the formal organization to effectively perform assignments.

- **Accountability** is the state of being totally answerable for the satisfactory completion of an assignment.

Nicholas (1990: 175) defines authority in general terms as the power of a manager to command others to act or not to act. He distinguishes between legal authority (which is conferred by the organization and is part of a job description) and charismatic authority (which stems from the power gained by personal characteristics, such as charm, personality and appearance).

Kerzner (1992: 245-246) views authority as the key to the project management process. Project authority is broken down into three constituent parts, namely *de jure* (legal) authority, *de facto* (reality) authority, and project charter authority. *De jure* and *de facto* authority are the same as the legal and charismatic authority identified by Nicholas (1990: 175). The project charter authority is exclusively applicable in project management and includes aspects, such as the approved project plan, the accepted cost estimate, and schedule commitments.

Unlike managers in traditional organizations, where the influence and authority flow vertically, project managers exist outside the traditional hierarchy. The position of the project manager is temporary, superimposed on the existing structure and therefore not privy to the same amount of leverage afforded by the legal authority through hierarchical position. A project manager works across functional and organizational lines and the influence and authority flow is both horizontal and diagonal.

Nicholas (1990: 177) notes that, despite the considerable amount of responsibility project managers must assume, they have very little formal authority to carry it out. This disparity is referred to as the authority gap. While project managers lack the necessary legal authority, other means (Youker, 1991: 40) for influencing people may be used. Nicholas (1990: 177) therefore concludes that successful project managers, no matter how much formal (legal) authority they posses, tend to rely on knowledge, experience and personal relationships for influence.

Finally, Kerzner (1992: 254-255) also notes that, because of the authority gap, project managers must rely on other means of influence. These include the use of coercive, connection, expert, information, legitimate, referent and reward power bases (Pitts, 1990: 22).

Proposition 13:
A success factor in the implementation of formalized project management is the ability of the project manager to utilize multiple forms of influence, such as knowledge, expertise, experience, negotiation, persuasion, and personal relationships due to the disparity in formal authority awarded and the responsibility assumed.

2.3.8.5 The skill requirements for the project manager

Kerzner (1992: 10) suggests that, in view of the project manager's responsibility for coordination and integration of activities across multiple functional lines (Karaa & Abdallah, 1991: 48), both strong communicative and interpersonal skills are needed. The project manager must further become familiar with the operations of each line organization and should also have a general knowledge of the technology.

Effective project management may be considered more behavioural than quantitative (Kerzner, 1992: 9). Project managers need a good understanding of quantitative tools and techniques but also of organizational structures, work group behaviour and in general, of human group theories (Rwelamila, 1989: 21).

The selection of a project manager is an executive decision and a general management responsibility. Usually the selection of a project manager is based more on personal characteristics than on a particular job description

(Kerzner, 1992: 176). Kerzner (1992: 176) and Nicholas (1990:178-179) summarize the broad range of desired personal characteristics which a project manager should exhibit as proposed by Archibald (1976). These include: flexibility, adaptability, initiative, confidence, persuasiveness, ambition, forcefulness, enthusiasm, imagination and spontaneity.

Nicholas (1990: 179-180) suggests that, apart from these essential personal characteristics listed above, the successful project manager should also have behavioural skills (be an active listener and communicator, build trust and promote team spirit), general business skills (understand the organization, business and general management) and technical skills.

Pettersen (1991: 22-24) provides an integrated requirements profile designed specifically for selecting project managers. His requirements profile consists of twenty-one predictors, grouped into five sets, labelled problem solving, administration, supervision and project team management, interpersonal relations and other personal qualities.

Kerzner (1992: 181-188) identifies ten major skill requirements which project managers should possess to meet the challenge of managing projects. The skills are (1) **team building** - an effective team should be built by the integration of the various task groups from traditional functional organization into a single project management system (2) **leadership** - the ability to lead the team within a relative unstructured environment with little formal authority (3) **conflict resolution** - understand the determinants of conflict and be able to resolve dysfunctional conflict (4) **technical** - understand the technology and the environment of the business in the search for integrated solutions and technological innovations (5) **planning** - be able to compile the project plan (6) **organizational** - understand how the organization works and how to work with the organization (7) **entrepreneurial** - a general management perspective is needed where the

objectives are broader than merely profit, such as customer satisfaction and future business opportunities (8) **administrative** - experienced in planning, staffing, budgeting, scheduling, and other administrative control techniques (9) **management support building** - build favourable relationships with senior management and (10) **resource allocation** - needs to negotiate for resources which are generally controlled by the line or functional managers.

Zuberi (in Wideman, 1991: V-2) emphasizes the need for a project manager to better grasp the issues relating to organizational leadership, power and influence. Zuberi argues that, with such an awareness, they may avoid being overwhelmed by the unfavourable aspects of modern organizations, including bureaucratic infighting, and the destructive power struggles which reduce initiative, innovation, morale and professional excellence.

Proposition 14:
A success factor in the implementation of formalized project management is the personal characteristics of a project manager, including adaptability, initiative, confidence, persuasiveness, enthusiasm, and imagination.

Proposition 15:
A success factor in the implementation of formalized project management is the behavioural skills (which include skills in team building, leadership and conflict resolution), general business skills (which include organizational, entrepreneurial, administrative and management support building skills) and technical skills (which include knowledge of technology, planning and resource allocation skills) of the project manager.

2.3.8.6 Leadership of the project manager

Kerzner (1992) identified leadership skills as a major skill requirement for a project manager (see subsection 2.3.8.5).

Kerzner (1992: 269) defines leadership as a style of behaviour which is designed to integrate organizational requirements and individuals' interests into the pursuit of some objective. Nicholas (1990: 196) views leadership as the ability to influence the behaviour of other people to accomplish objectives while leadership style refers to the way a leader achieves such influence.

Nicholas (1990: 196) further notes that leadership styles can be divided between two extreme poles, namely task-oriented and relations-oriented. Task-oriented leaders show a high concern for the achievement of goals and the work itself and tend to behave in an autocratic fashion. Relations-oriented leaders, however, show greater concern for people and tend to exercise a democratic kind of leadership.

While many studies have been undertaken to find the most appropriate leadership style in a project environment, Nicholas (1990: 196) concludes that the most effective style depends on the characteristics of the leader, the followers, the nature and the environment of the tasks. This perspective, referred to as the contingency approach, is based on Fiedler's (1967) contingency model. Given the likely situation a project manager would encounter (low formal authority granted, high respect by the team members for ability and expertise, and high task complexity), Fiedler's model would indicate that a relations-style would be most effective (Nicholas, 1990: 197).

Proposition 16:
A success factor in the implementation of formalized project management is for the project manager to follow a relations-oriented leadership style.

Both Kerzner (1992: 270-273) and Nicholas (1990: 197-199) describe the application of Hersey and Blanchard's (1979) situational leadership model in a project environment. Based on the task and relations behaviour of the leader and the maturity of the followers (ability and willingness to comply), four different leadership styles are identified. In simple terminology, these are delegating, participating, selling and telling. Kerzner (1992: 273) notes that the project environment is highly situational and that each employee should be treated differently. Nicholas (1990: 198) concludes that most members of the project team would demonstrate maturity and, given their level of ability and willingness, a participating and delegating leadership style would be most effective.

Proposition 17:
A success factor in the implementation of formalized project management is for the project manager to follow a leadership style based primarily on participation and delegation.

2.3.8.7 Management of conflict by the project manager

Kerzner (1992) identified conflict resolution skills as another major skill requirement for a project manager (see subsection 2.3.8.5)

Kerzner (1992: 412) notes that conflicts in the project environment are inevitable. This he explains is a natural occurrence resulting from the

differences in the organizational behaviour of individuals, the differences in the way functional and project managers view the work required, and the lack of time necessary for these managers to establish ideal working relationships.

Nicholas (1990: 218) agrees that conflict is inevitable but not necessarily always detrimental. It may help to produce better ideas, force people to search for new approaches, cause persistent problems to surface and be dealt with, force people to clarify their views, cause tension which stimulates interest and creativity, and give people the opportunity to test their capabilities.

Nicholas (1990: 219) further points out that, while conflict between groups in competition is beneficial because it increases group cohesion, spirit and loyalty, conflict between cooperating teams in a project situation may be destructive. Groups in conflict selfishly strive to achieve their own objectives and block the objectives of other teams. Left uncontrolled and unresolved, such conflict may foster lack of respect, lack of trust and may also destroy the communication between groups and individuals, all which are detrimental to the project spirit.

Kerzner (1992: 412) suggests that the most common type of conflicts in the project environment involve labour resources, equipment and facilities; expenditure of capital; technical solutions and trade-offs; priorities; administrative procedures; scheduling; responsibilities; and personality clashes. The relative intensity of these conflicts may vary over the life cycle of the project.

Kerzner (1992: 416-433) and Nicholas (1990: 219-220) report a study by Thamhain and Wilemon (1975) that determined the type and magnitude of a particular type of conflict that was most common at a specific life cycle

phase. This study indicated that, on average, the three greatest sources of conflict were project schedules, project priorities and the work force.

Kerzner (1992: 430) therefore recommends that to minimize the detrimental conflict, intensive prior planning of scheduling, priority setting and resource allocation should take place.

Referring to conflict-handling modes, Kerzner (1992: 432) suggests that it is less important to search for a single best mode of effective conflict management but rather that project managers, in their capacity as integrators of diverse organizational resources, employ the full range of conflict resolution modes (Baker, Tjosvold & Andrews, 1988: 167). While both Nicholas (1990: 220) and Kerzner (1992: 429) conclude that the confrontation mode appears to be the ideal approach in the project-oriented environment, other approaches, such as compromise, smoothing (or de-emphasizing), forcing and withdrawal, may be effective, depending on the situational content of the disagreement.

In summary, Nicholas (1990: 221) concludes that a presumption in project management is that conflict is inevitable and best resolved by confrontation. Kerzner (1992: 433) concludes that conflict is fundamental to complex task management. Project managers should not only be cognizant of the potential sources of conflict, but should also know when in the life cycle of a project they are most likely to occur and which conflict resolution mode to employ. The project manager should thus avoid the detrimental aspects of conflict but maximize its potential beneficial aspects.

Proposition 18:
A success barrier factor for the implementation of formalized project management is the high propensity of conflict in a project environment with regard to project schedules, project priorities and resource allocation.

2.3.9 The project team

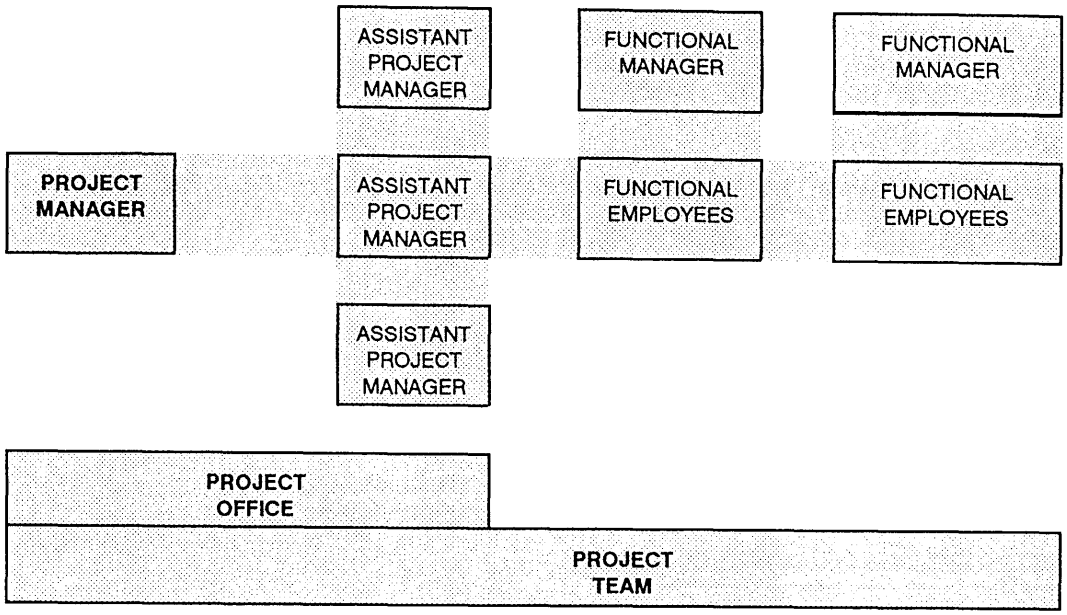
2.3.9.1 The members of the project team

Project management is not a one-person operation; it requires a participative group of individuals (Vogt & Hunt, 1988: 96) dedicated to the achievement of specific project objectives (Kerzner, 1992: 168).

The project team - with the project manager as team leader - consists of a combination of project office personnel and functional employees. While the project team members who work out of the functional units may spend only a portion of their time on the project, project office personnel in large project undertakings are assigned full-time to the project. The full-time project office personnel report directly to the project manager but may still be under the control of a line function for administrative control. Figure 2.3.4 illustrates the composition of the project organization.

Kerzner (1992: 517) suggests that, for high task efficiency and productivity, a project team should exhibit certain traits and characteristics. The project manager expects the project team to: be committed to the project; show the potential for innovative and creative behaviour; be results-oriented; interface effectively; and be change-oriented.

Figure 2.3.4: The project organization



Source: Kerzner, H. 1992. *Project management: a systems approach to planning, scheduling and controlling*. Van Nostrand Reinhold. Figure 4-8. p. 208.

Kerzner (1992: 516) also lists some expectations that the project team have of their team leader, the project manager. The project manager should assist in the problem-solving process; provide proper direction and leadership; stimulate group processes; reduce conflicts; defend the team against outside pressures; act as the group spokesperson; and provide representation with top-level management.

Proposition 19:
A success factor in the implementation of formalized project management is the creation of a cohesive participative project team which consists of a group of individuals dedicated to the achievement of the specific project objectives.

2.3.9.2 The project office

The project office is an organization developed to support the project manager in carrying out his duties. The personnel of this office should have the same dedication to the project as the project manager and further should also have a good working relationship with the functional managers.

The determination of the optimal size of the project office is an important consideration. The optimal size is determined by a trade-off between the maximum number of members necessary to assure compliance with the requirements and the minimum number for keeping the total administrative costs under control (Kerzner, 1992: 208).

Membership is determined by factors, such as the project size, internal support requirements, the type of project, level of technical competency, external customer support requirements and strategic importance of the project.

Although project managers would prefer to have all of their key personnel assigned full-time to the project, this may be both undesirable and impossible (Kerzner, 1992: 209). Many factors favour keeping the full-time project office as small as possible. Some of these factors identified by Archibald (1976) are summarized by Kerzner (1992: 210) as:

- The skills required by the project may vary considerably as the project progresses through each of its life cycle phases.

- Building up large permanently assigned project office personnel for each project inevitably causes duplication of certain skills, carrying personnel who are not needed on a full-time basis, and personnel difficulties in reassignment.

- The project manager may be diverted from his primary task and become involved in dealing with personnel problems of a large office rather than concentrating on the managing the project itself.

- Professionally trained people often prefer to work within a group devoted to their own professional area rather than become isolated from their speciality by being assigned to a permanent project office.

- Projects are subject to sudden shifts in priority or even cancellation, and full-time members of a project office are thus exposed to potentially serious threats to their job security.

According to Kerzner (1992: 207), the major responsibilities of the project office include:

- Acting as the focal point of information for both in-house control and customer reporting.

- Controlling time, cost and performance to adhere to contractual requirements.

- Ensuring that all work required is documented and distributed to all key personnel.

- Ensuring that all work performed is both authorized and funded by contractual documentation.

Proposition 20:
A success barrier factor in the implementation of formalized project management is the creation of a large project office with many full-time assigned professional specialists.

2.3.9.3 Staffing the project team

Organizing and staffing the project office and project team in a project environment (which by definition is a temporary situation) may become complex. Kerzner (1992: 169-170) concludes that conflicts and priority-setting become a way of life during the staffing process. He identifies two major kinds of problems related to the staffing process in a project environment:

- **Personnel performance**. Working in a project environment may be difficult for many individuals because it represents a change in the way things are normally done. Individuals find it difficult to adapt to continuously changing situations in which they have to report to multiple managers.

- **Personnel policies**. These may create problems in the organization, especially if the project environment is considered better than the functional environment. Usually the opportunities for advancement and bonuses for outstanding performance are easier to obtain in the project office than in the line organization. Conflict and jealousy may thus result between horizontal and vertical elements in the organization.

Kerzner (1992: 169) further observes that the project management process itself may cause problems during the staffing process. He argues that the

project management process allows each project to have its own policies, procedures, rules and standards, provided they fall within the broad organization's guidelines. The project manager must therefore have the delegated authority to enforce the policies, procedures, rules and standards.

Kerzner (1992: 259-262) identifies some barriers to effective team building. Briefly, they are differing outlooks, priorities of team members; role conflicts; unclear project objectives; team personnel selection; credibility of project leader; lack of team member commitment; and communication problems.

Ultimately, however, the person with the greatest influence during the staffing phase is the project manager himself. The personal attributes and abilities of the project manager will either attract highly desirable individuals working with a particular project manager or deter them from doing so. Some of these personal characteristics were listed in subsection 2.3.8.5.

Proposition 21:
A success barrier factor in the implementation of formalized project management is the complexities involved in staffing the project team, such as personnel performance evaluation and consistent application of personnel policies.

2.3.9.4 The functional members of the project team

Functional or interface members are not full-time members of the project team. They are usually only assigned to some specific phase of the project. Functional members report both horizontally to the project manager and vertically to their functional heads. Functional representatives performing

at the interface position also act as integrators (similar to the project manager and project office personnel) but at a closer position to where the work is actually accomplished in the line organization.

The functional managers are responsible for maintaining the technical competence of their disciplines (Jerkovsky, 1983: 91) and for staffing, organizing, supervising (Lehman, 1987: 18) and executing the project tasks within their respective functional areas (Nicholas, 1990: 186).

Kerzner (1992: 14) identifies two elements of the functional manager's role:

- The functional manager has the responsibility to define how and where the tasks will be done.

- The functional manager has the responsibility to provide sufficient resources to accomplish the project objective within the constraints, that is, to determine who will get the job done.

Once the project manager identifies the requirements for the project (i.e. what the work is and the constraints), it becomes the line manager's responsibility to identify the technical criteria. All resources, including personnel, are under the control of the line manager. Although the project manager may request specific staff (project team members), the final appointments usually rest with the line manager.

Proposition 22:
A success barrier factor in the implementation of formalized project management is the dual reporting relationship of team members who report both vertically to their functional heads and horizontally to the project manager.

2.3.9.5 The roles outside the project team

Nicholas (1990: 187-188) identifies two roles outside the project team. They are the role of manager of projects and the role of top-level management.

The first role outside the project team, the manager of projects, oversees multiple projects and thereby relieves top-level management of many project responsibilities. The manager of projects directs and evaluates the activities of all the project managers; ensures that the stream of projects is consistent with the strategic objectives of the organization; resolves priority conflicts between projects; develops project management policies, planning and control techniques and ensures consistency among projects.

The second role outside the project team, top-level management, establish the organizational mission and goals as well as the policies and strategies to accomplish them. Their involvement with project management will vary depending on the size of the organization and the nature of the projects. In smaller organizations, top-level management usually take on the responsibilities of manager of projects.

Kerzner (1992: 515-516) discusses the expectations that top-level management have of project managers and vice versa, the expectations project managers have of top-level management. Top-level management expect the project manager to assume total accountability for the success or failure of the project; provide complete reports and information; and cause minimum organizational disruption during the execution of the project.

Project managers expect top-level management to provide clearly defined decision channels; facilitate interfacing with functional departments; provide sufficient resources and provide protection from political infighting.

Ultimately, top-level management are responsible for the successful implementation of project management. Nicholas (1990: 186) suggests that for project management to be effective, top-level management must define the project manager's responsibility and authority relative to other managers; define the scope and limitations of the project manager's decision-making responsibility; and support the project management system that provides the information necessary for planning, control, review, and evaluation of projects.

Proposition 23:
A success factor in the implementation of formalized project management is the appointment of a manager or director of projects, where multiple concurrent projects are undertaken, whose responsibility would include overseeing the activities of all project managers and ensuring that all projects are consistent with the strategic objectives of the department.

Proposition 24:
A success factor in the implementation of formalized project management is for project managers to assume total accountability for the success or failure of the project and cause minimum organizational disruption during the execution of a project.

Proposition 25:
A success factor in the implementation of formalized project management is for top-level management to accept overall responsibility for the successful implementation of project management.

2.3.10 The project management system

2.3.10.1 Project organizations

For the project manager and project team to perform effectively, a project management system is needed (Nicholas, 1990: 11). A part of this system, which provides for integrative planning and control, is the organizational structure.

As pointed out previously, project management is based primarily on the systems approach to management. This approach views organizations as human and physical elements which interact to achieve the goals of the organization. As with all types of systems, organizations can partly be described by their structure - that is, the form of relationships that bond their elements.

Nicholas (1990: 139) suggests that two types of structures coexist in organizations. The first type, which is the focus of this subsection, is the formal organizational structure. It is the published structure which describes the normal superior-subordinate relationships, chain of command, sub-divisions and groupings of elements. The second type, the informal structure, comprises the relationships that evolve through the interactions of people and includes the groupings and communication lines that exist in the organization but do not appear on the formal organizational chart.

2.3.10.2 Organizational structures

Kerzner (1992: 102) refers to the hidden organizational revolution which saw the introduction and development of new organizational structures. The revolution was in response to environmental factors and a requirement for better utilization and control of resources. These factors required

organizations to be more dynamic in nature and capable of rapid restructuring when conditions in the environment dictated change.

Proposition 26:
A success factor in the implementation of formalized project management is a dynamic organizational structure, capable of rapid restructuring when conditions in the environment dictate change.

Nicholas (1990: 140) suggests that the structures of organizations develop through a combination of planned and evolutionary responses to ongoing problems. Organizations create specialized roles and units, each with suitable expertise and resources needed to resolve certain types of problems efficiently (Kabasakal, Sözen & Üsdiken, 1989: 347). When organizations grow in size or the environment changes, additional and new groupings are implemented to better handle the emerging problems. While the subdivision into specialized areas refers to differentiation, the degree to which the subunits of the organization interact, coordinate and mutually adjust their actions to fulfil organizational goals is referred to as integration.

Nicholas (1990: 142) further identifies six bases for differentiation:

- **Functional differentiation**. The organization is divided into functional subunits, such as finance, marketing, and production. The integration between the subunits is handled by rules, procedures, coordinated plans and budgets, and the chain of command. This form of organization is well suited to repetitive-type operations with stable environments where little change occurs and the need for integration is low.

- **Geographic differentiation**. Most organizations have more than one

basis for differentiation. They may also subdivide according to geographic region in order to better direct themselves to the unique requirements of local customers, markets and competition.

- **Product differentiation**. This base is used where various products are produced. Each major subdivision designs, manufactures and markets its own product line. Within each subdivision a functional, geographic or other form of breakdown may also occur.

- **Customer differentiation**. Differentiation is by customer. The level of integration between customer divisions depends on the degree of interdependence between their product lines.

- **Process differentiation**. Some logical process or sequence of operation, such as design, development and assembly, is used as the basis for differentiation. A high level of integration is required among process-differentiated subunits since they are sequentially related and problems in one area will directly impact on other areas.

- **Project differentiation**. Projects require the resources and coordinated work efforts of multiple subunits and organizations. Changes in one area have consequences on all the others. Project organizations must be organic, which refers to the ability to respond to a large variety of potential problems involving multiple subunits and also be flexible to alter structural requirements as goals change. Two essential properties needed are (1) horizontal relations to integrate the subunits and (2) organizational structures which are suited to the unique requirements of the project and the project environment.

Proposition 27:
A success barrier factor in the implementation of formalized project management is a pure, functional, differentiated organization where integration is established primarily by rules, procedures and the chain of command.

Proposition 28:
A success factor in the implementation of formalized project management is a project-differentiated organization to accommodate flexibility in the structural requirements and incorporate formal horizontal relations to integrate the work efforts of multiple subunits.

Finally, both Kerzner (1992: 104) and Nicholas (1990: 139) contend that there is no such thing as a good or bad structure - only appropriate and inappropriate ones. The most appropriate structure depends on the organization's goals, type of work, and environment.

2.3.10.3 The development of the matrix structure

Kerzner (1992: 107-138) describes the evolution of the traditional (classical) or functional structure, the pure product or project structure, to the matrix organizational form. A brief exposition of the evolution, described by Kerzner, is provided in order to identify some of the criteria which need to be considered when implementing formalized project management.

The main disadvantage of the traditional structure was that it had no strong central authority or an individual directly responsible for the total project. It therefore lacked the ability to integrate the activities of different functional groups. Other disadvantages were that coordination across functional lines

was complex; top-level management became involved in daily activities; conflicts occurred as each functional group struggled for power; decisions favoured the strongest functional group; no customer focal point was established; and it was difficult to pinpoint responsibility because of little or no direct project reporting.

However, advantages of the traditional form included the concentration of technical expertise through functional specialists; well-defined and understood policies, procedures and responsibilities; each employee reporting to one person only; and being well suited to mass production.

Proposition 29:
A success barrier factor in the implementation of formalized project management is the use of a traditional functional structure in a project environment.

Notwithstanding the advantages of the traditional form, management realized that the critical point in projects was the interface between the functional units. Consequently innovative methods, which could coordinate the flow of work between these units without modification of the existing structure, were first proposed. The coordination between units was achieved through integrating mechanisms, such as rules, procedures, detailed planning, hierarchical referral, and direct contact and interactions by functional managers.

These new methods proved ineffective in many organizations, however, because there was still a need for a focal point for the project to ensure that all activities would be properly integrated. The alternatives considered for the placement of such integrating positions were firstly, the appointment of temporary project leaders or coordinators within each functional

department, secondly, the creation of task forces in which each functional unit placed a representative on the task force, and thirdly, the establishment of liaison departments which would handle all transactions between functional units. For various reasons, these alternatives again proved ineffective.

Proposition 30:
A success factor in the implementation of formalized project management is the establishment of a focal point for the integration of work flow between subunits.

It then became obvious that the control of a project had to be given to personnel whose first loyalty was directed to the completion of the project. For this to be achieved, the responsibility for the management of projects had to be separated from any controlling influence of the functional units.

Two forms of line-staff project control were developed. In the first, the project manager was merely the focal point for activity control and information, and in the second, the project manager, although having more authority, still could not operate across functional boundaries.

Proposition 31:
A success factor in the implementation of formalized project management is the separation of the responsibility for the management of a project from the controlling influence of functional units.

Next was the development of the pure product or project organization where a separate division is created for each project. In this form, the project manager had complete line authority over the entire project. Other

advantages of this form were that project participants worked directly for the project manager; expertise was maintained on a project without sharing key personnel; personnel demonstrated loyalty to the project; and a focal point developed for outside customer relations.

The main disadvantage of the project organizational form was the cost of maintaining the organization. The inefficient use of resources through the duplication of effort, facilities and personnel, prohibited the general use of this structure. Other disadvantages were that technology was compromised without strong functional groups and top-level coordination of functional specialists was required.

Proposition 32:
A success barrier factor in the implementation of formalized project management is the creation of a separate, autonomous project organization for each project.

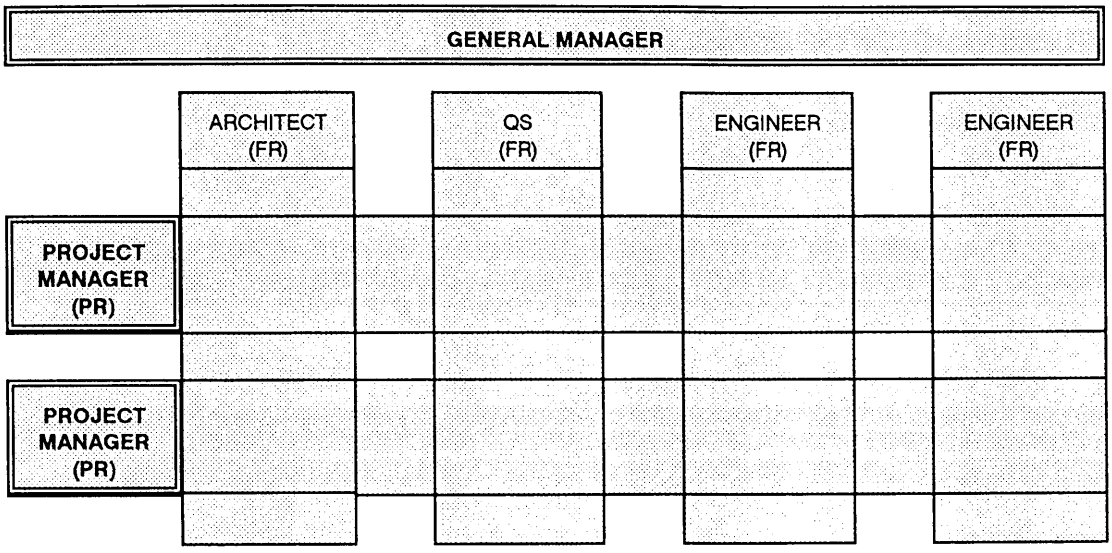
From the above exposition it may be seen that the birth of the matrix organizational form was thus inevitable. This form attempts to combine the advantages of the functional (traditional) structure and the pure project structure.

2.3.10.4 The matrix organizational structure

The matrix approach is an attempt to create synergism through shared responsibility between project (horizontal line) and functional (vertical line) management (Brown & McK. Agnew, 1982: 51). The matrix is simply horizontal lines superimposed over a traditional structure (Burns, 1989: 350). The horizontal lines present themselves as projects start up but disappear when they are completed. The traditional structure, however,

remains as long as the organization still exists. Figure 2.3.5 illustrates an example of a balanced matrix structure (terminology used by Larson & Gobeli, 1987: 128).

Figure 2.3.5: The balanced matrix structure



KEY: FR = Functional responsibility
PR = Project responsibility

Source: Adapted from Kerzner, H. 1992. *Project management: a systems approach to planning, scheduling and controlling*. Figure 3-7. p. 121.

Kerzner (1992: 125-126) lists the following advantages of the matrix structure:

- Through the line or functional managers, the project manager maintains maximum project control over all resources, including personnel and costs.

- Policies and procedures can be set up independently for each project provided they do not contradict organizational policies and procedures.

- The project manager has the authority to commit organizational resources provided this does not cause conflicts with other projects.

- Rapid response to changes, conflict resolution and project needs is possible.

- The functional organization exists primarily as support for the project.

- Each person has a permanent position to return to after project completion. People are thus susceptible to motivation and end-item identification.

- Key people can be shared and the costs can thus be minimized.

- A strong technical base can be developed and maintained by functional managers. Knowledge is available for all projects on an equal basis.

- Although conflicts are inevitable, they can "easily" be resolved through hierarchical referral.

- A better balance between time, cost and performance objectives can be obtained.

- Rapid development of specialists (through functional line) and generalists (through project line) can occur.

The matrix structure provides the best of the functional and the pure project structure. Kerzner (1992: 126) argues that the advantages of the matrix structure eliminate most of the disadvantages of the traditional structure.

Nicholas (1990: 143-144) argues that the major drawbacks of traditional forms of organizations stem from their inherent design. These organizational forms work on the assumption that problems can be classified neatly and resolved within specialized areas. The subunits of these organizations, which tend to work independently and towards their own goals, can therefore only address anticipated, classifiable kinds of problems. When the environment changes and new kinds of unanticipated, unclassifiable problems arise which requires participation from multiple subdivisions, the organization reacts by further differentiating the subunits and adding more rules, procedures and levels of management.

This results in less flexibility and greater difficulty in integrating subunits. Traditional organizations, which are characterized by their verticalness, pyramidal "one-boss" structures (Denis, 1986: 148) and reliance upon up-anddown patterns of authority and communications, are thus not well suited for environments where there is a high degree of uncertainty and frequent change.

By contrast, matrix organizations are characterized by their horizontalness or use of direct communication between parties involved in a problem. Horizontal relations cut across the lines of authority and move decisions down to the parties affected. While most organizations have horizontal relations, such as personal contacts and friendships, these personal contacts, which bypass the formal structure, do not insure that all participants have access to the necessary information. Project organizations improve upon these informal, personal contacts by incorporating formal horizontal relations into the structure. This is done through the use of functions referred to as integrators, which reduce the number of decisions which are referred upward and facilitate communication between subunits. Like informal processes, integrators bypass traditional lines of authority and speed up communication. Nicholas (1990: 145-153) lists the following

integrators which may be used in projects:

- **Liaison role**. This is performed by a specialized person or group that links two departments at lower levels. The result is that informal contacts between departments are legitimized.

- **Task forces and teams**. A task force is a temporary group of representatives from several areas that meet to solve a problem. Once the problem has been worked out, the task force is dissolved. Problems which call for continuous coordinated interaction of subunits require the attention of more permanent teams. These teams have the same characteristics as task forces but they convene on a regular basis and for longer periods of time.

- **Project expediters and coordinators**. Where a project affects only one functional area, the team is managed by a staff assistant selected by the manager of the area where the project lies and referred to as the project expediter. The expediter has typically no formal authority over team members and must rely on persuasion, personal knowledge and information about the project to influence team members. Where a project affects more than one functional area, a multifunctional team is created and located in either the functional area most responsible for the project or at a higher level position. This team is managed by a project coordinator. Though the coordinator has no line authority over the team members, he does have the authority to make decisions on project budgets, schedules, work performance and command action based on these decisions.

- **Project managers**. A project manager heads the pure project organization. Projects that entail a high level of complexity require major resource commitments and those that entail a large stake in the

outcome require a pure project form of organization. Three common variations of the pure project structure are (1) the project centre (where the structure of the parent organization remains the same except for the addition of a separate project "arm" and manager), (2) the stand-alone project (where a new organization is created from several participating organizations especially for the purpose of accomplishing the project), and (3) the partial project (where certain functions critical to the project are assigned to the project manager while other, support-oriented functions remain within the functional areas in a parent organization).

- **Matrix managers**. Organizations that continually operate on a project basis or are multiproject oriented because they are involved in more than one project at a time utilize matrix management. The primary effort of the project manager (also referred to as the matrix manager) is integration. The project manager works with the functional managers to accomplish the project.

Nicholas (1990: 153-154) elaborates on the problems with matrix organizations. The strong point of the organization, the vertical-horizontal structure, is at the same time the root cause of its problems. The matrix is not just a structure variation, but also a whole different way of doing things (Kur, 1982: 41). To be successful, it must be reinforced by information systems and human behaviour that support two-dimensional information flow and dual reporting relationships (Joyce, 1986: 536). Most organizations are accustomed to hierarchical decision making and vertical information flow. The matrix, by contrast, places its emphasis on horizontal relations, lateral information flow and decentralized decision making.

The matrix is also conflict inducing. While theoretically the two-dimensional structure promotes coordinated decision making among functional areas

and further assumes that a balance in power exists between functional and project managers, authority in the matrix is often unclear. Since each worker in the matrix has two managers (a functional and a project/matrix manager), the matrix violates a major principle of management, namely single, scalar chain-of-command (Pitts & Daniels, 1984: 54). The inevitable result is role conflict. Any attempt to adopt the matrix must be accompanied by both attitudinal and cultural change.

Kerzner (1992: 126-128) lists the following disadvantages of the matrix organizational form:

- Increased multidimensional information and work flow with dual reporting relationships.

- Management goals may differ from the project's goals should top-level management not be involved at the definition of the project's requirements in the planning phase.

- Continuous potential for conflicts in the matrix and the possible need for conflict resolution when priorities change.

- Possible difficulties for monitoring and control due to the complex, multidirectional work flow.

- A possible need for more administrative personnel which might cause the organizational structure to be cost ineffective.

- More effort and time needed initially to define policies and procedures than the traditional organizational form.

- Functional managers may possibly be biased according to their own

set of priorities.

- The greater need to monitor the balance of time, cost and performance closely.

- Employees and managers may be more susceptible to role ambiguity than in the traditional organizational form.

- Possible interruption of the stability of the organization and the long-range plans by project priorities and competition for talent as the organization gets involved in meeting schedules and fulfilling the requirements of temporary projects.

- Disruption of the training of employees and specialists through shifting people from project to project thereby hindering growth and development within their own fields of specialization.

The matrix is therefore a compromise in an attempt to obtain the best of two worlds. In pure project management, technology was compromised because of the absence of a strong functional group. In the pure functional structure, time and schedule requirements were sacrificed. Matrix management is an attempt to obtain maximum technology and performance in a cost effective manner within time and schedule constraints. It should be noted, however, that through proper top-level planning and control (Carpenter, 1983: 10), most of the disadvantages of the matrix may be eliminated (Kerzner, 1992: 129).

Proposition 33:
A success factor in the implementation of formalized project management is the use of a matrix organizational structure where the traditional, vertical structure is retained and formal horizontal project relations are superimposed.

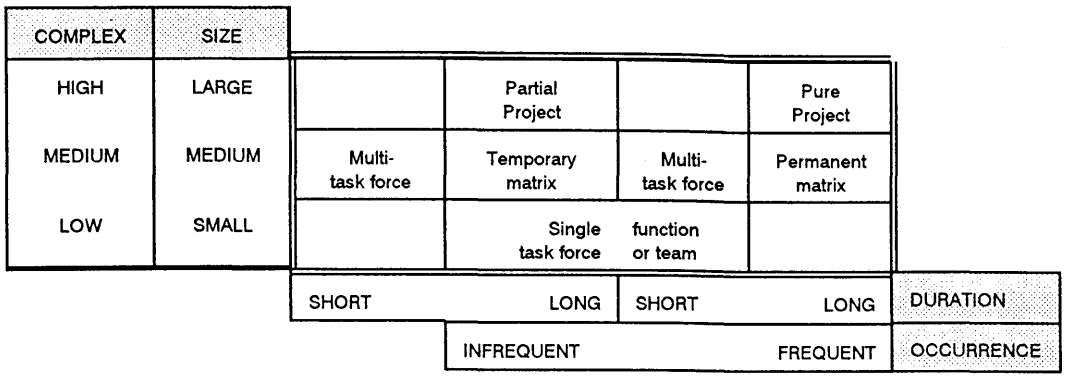
2.3.10.5 The selection of an organizational structure

Kerzner (1992: 139-140) lists some basic factors that influence the selection of a project organizational form. These are the project size, project length, the experience with a project management organization, the philosophy and visibility of top-level management, project location, the available resources and the unique aspects of the project.

Nicholas (1990: 154-158) also lists criteria which may help to decide which form of a project organization is the most appropriate and applicable for a given project. These criteria, illustrated in figure 2.3.6, include:

- The frequency of new projects and to what degree the parent organization is involved in the project-related activities.
- The duration (length in time) of the project.
- The size of the project, including the level of human, capital or other resources in relation to the other activities of the organization.
- The complexity of relationships including the number of functional areas involved in the project and the degree of interdependence.

Figure 2.3.6: Criteria for selection of project organizational forms



Source: Nicholas, J.M. 1990. *Managing business and engineering projects: concepts and implementation*. Figure 7-9. p. 155.

Briefly, according to figure 2.3.6, matrix and pure project forms in general, are more applicable to projects of medium to higher complexity and also of medium to large size. The projects have greater resource and information requirements and need integrators with a strong central authority. The risk and uncertainty are high and the time and cost goals are critical. There is much at stake and such project forms better afford the obligatory high level of integration and control.

In particular, the matrix form works best where there is a variety of different projects simultaneously and where all can share functional resources on a part-time basis. By contrast, where there is less variety among projects, when specialists must be devoted full-time and when full project authority is desired, the pure project form is more applicable. The complexity of the matrix and the large human and facility requirements of the pure project form may present major problems to the parent organization, however, and should thus be avoided when simpler forms would work as well.

For smaller projects involving several functional areas where the project tasks involve high certainty and little risk, and time and cost are not major

factors, task forces and teams which basically link functional areas are more appropriate. Short-term projects in one or a few functional areas can be effectively managed by part-time task forces and an expediter in one functional area. Where several areas are involved, a multifunctional task team with a coordinator who reports to a higher level management is more suitable. Projects of longer duration, but small in scope and low in complexity are best handled by full-time project teams with coordinators. When the team size needed to accomplish the task becomes large and interrelationships become too complex, a temporary matrix or partial project organizational form could be used. Teams, task forces and project centres are appropriate when the normal structure and work flow of the organization may not be disrupted.

Kerzner (1992: 140-144) proposes that the following three fundamental parameters be analyzed when considering implementation of a project organizational form:

- **Integrating devices**. Project management is a means of integrating all organizational efforts by the selection of an appropriate organizational form. Informal integration, where the role of the integrator is simply to act as an exchange medium across the interface of two functional units, may work well only when effective collaboration can be achieved between separate units.

- **Authority structure**. Top-level management must decide on the authority structure that will control the integrating mechanisms. This may vary from the pure functional authority (traditional management) to project authority (project management) and finally to dual authority (matrix management).

- **Influence distribution**. Integration of activities across functional

borders may also be accomplished by influence and includes such factors as participation in budget planning and approval, design changes and salaries.

Project management with a matrix works well for the control of human resources and may thus be more applicable to labour-intensive projects than capital-intensive projects.

Proposition 34:
A success factor in the implementation of formalized project management is involvement in a large variety of different labour-intensive projects simultaneously, where the time and cost goals are considered critical.

Finally, Nicholas (1990: 158) concludes that project organizational structures should not be "cast in stone" and when ineffectual, the structure should be changed to best suit the requirements. Kerzner (1992: 147) concurs and indicates that management should realize that, whichever project management structure is selected, a dynamic state of equilibrium will exist.

2.3.10.6 Converting to a new organizational structure

Should a traditional organization choose to convert to a new project-oriented organizational structure, Kerzner (1992: 150) notes that successful implementation requires good transitional management. This he defines as the art and science of managing the conversion period from one organizational design to another.

Kerzner (1992: 150-151) reports that a survey of executives, managers and

employees of organizations who had implemented matrix management indicated that the greatest success in transition was attributed to proper training and education during and after the transition. In addition, other key variables noted were smooth transfer of power; trust between functional and project managers; flexible policies and procedures; fixed priorities; solving personnel problems; multidirectional communication; acceptance of the project manager; avoidance of detrimental competition; integrated tools and techniques; avoiding contradicting demands; standardization of project reporting; promoting teamwork; utilizing appropriate leadership styles; and increasing management resources.

Kerzner (1992: 151-152) suggests that transition to a project-driven organization is difficult and managers should also consider the following: the planning must be done on a life cycle basis; employees must be trained in project management knowledge, skills and attitudes (also see Levine, 1992: 35); employee involvement and acceptance is a requirement; top-level management must demonstrate commitment to and involvement with project management; an intensive focus on organizational behaviour is a prerequisite; and increased conflict must be resolved.

Finally, it should be noted that Kerzner's (1992) focus on transitional management is primarily from an organizational restructuring viewpoint. Transitional management for the implementation of formalized project management, however, would require a more holistic perspective (Carpenter, 1983: 9) where attention is given to several of the organization's design variables (Galbraith & Kazanjian, 1986: 39). These will be described in subsection 2.4.7.3.

Proposition 35:
A success barrier factor in the implementation of formalized project management is the organizational restructuring required to convert to a project-driven matrix.

Proposition 36:
A success factor in the implementation of formalized project management is the training and education of personnel in project management before, during and after the transition to a project-driven matrix.

Proposition 37:
A success factor in the implementation of formalized project management is effective transitional management when converting to a new organizational structure through planning, employee involvement, top-level management commitment, focus on organizational behaviour and conflict resolution.

2.3.11 The functions of project management

PMI (PMBOK: 1987) distinguishes eight project management functions. The functions are divided into four core and four facilitating functions.

The core functions lead to specific objectives which are integrated with one another and with the project life cycle. Together they form the frame of reference against which the success of the project may be measured. From the project sponsor's perspective, they represent a set of requirements while from the project manager's perspective, they represent parameters or constraints. Achieving these respective objectives or working within

these parameters constitutes the four basic project management functions. The core project management functions are scope, quality, time and cost management (Wideman, 1987: II-4).

The facilitating functions are the means through which the objectives of the basic functions are achieved. The facilitating functions are risk, human resources, contract/procurement and information/communication management (Wideman, 1987: II-5).

In general, the core functions of project management reflect the objectives of the project or what is to be achieved while the facilitating functions provide the means for accomplishing these objectives or how it is to be achieved.

The process of project management is the integration of these two types of functions which leads to the ultimate goal of project success. The core functions tend to make use of mathematics (as in scheduling and cost control) but the facilitating functions, by contrast, require positive interaction between people and therefore depend much more on the management theory of the social sciences.

A brief description of each of the core and facilitating functions is given. Full details of each function (including a function chart, function impact matrix chart and a glossary of terms) are presented in the PMI's PMBOK document of 1987. The PMI's Standards Committee began work on an update of this document in 1991 and it was decided that the eight current knowledge areas (functions) be maintained (Duncan, 1993: 6). The detailed breakdown and description of each function are considered important contributions to the explanation of the contents and self-imposed limits of the PMBOK. Recently Lustig (1994: 36) proposed that these eight functions be used in evaluating the benefits of re-engineering efforts in organizations.

Project management core functions (Wideman, 1987: II-4,5):

- **Scope management**. This involves defining the project's required products or outputs and listing all activities to be performed within the resource constraints. Since the scope of a project must first be identified and developed and may then change during the project's life cycle, there is a need for continual scope management.

- **Quality management**. For a project to be considered satisfactory, certain standards of quality must be defined and achieved. This involves carrying out a project throughout the four basic phases of the project life cycle with zero deviation from the project specifications.

- **Time management**. The life of a project is finite - consequently the time available for completion is limited. Time is an inflexible resource, which means that activities required for the project must be carefully planned and scheduled if they are to be completed within the time available.

- **Cost management**. "Time is money" is a well-recognized phrase in the modern society which closely associates inflexible time with the more flexible monetary resource.

Project management facilitating functions (Wideman, 1987: II-4,5):

- **Risk management**. Because of the relative uniqueness of every project and the rapidly changing conditions during a project's life cycle, the final outcome of every project is uncertain. Uncertainty is associated with probability and risk. Management should take steps to mitigate the possibility that requirements will not be met by

reducing the project risk wherever this can be achieved in a manner compatible with the overall project objectives.

- **Human resources management**. Projects are achieved through the respective skills and talents of people. During the course of the project the number of people and their types of skill vary and, furthermore, many may only be required for a short period. These temporary alliances call for interactive and flexible relationships. For such an assembly of people, interactions and motivation to work together effectively requires a clear understanding of their respective roles and responsibilities.

- **Contract/procurement management**. The willing contribution of people's services is needed for the execution of a project. Services external to the organization may be purchased through contracts while the services of those within the organization also have to be acquired. This function involves the commitment of resources to a project as well as the administration of their conduct or delivery in order to produce the end product.

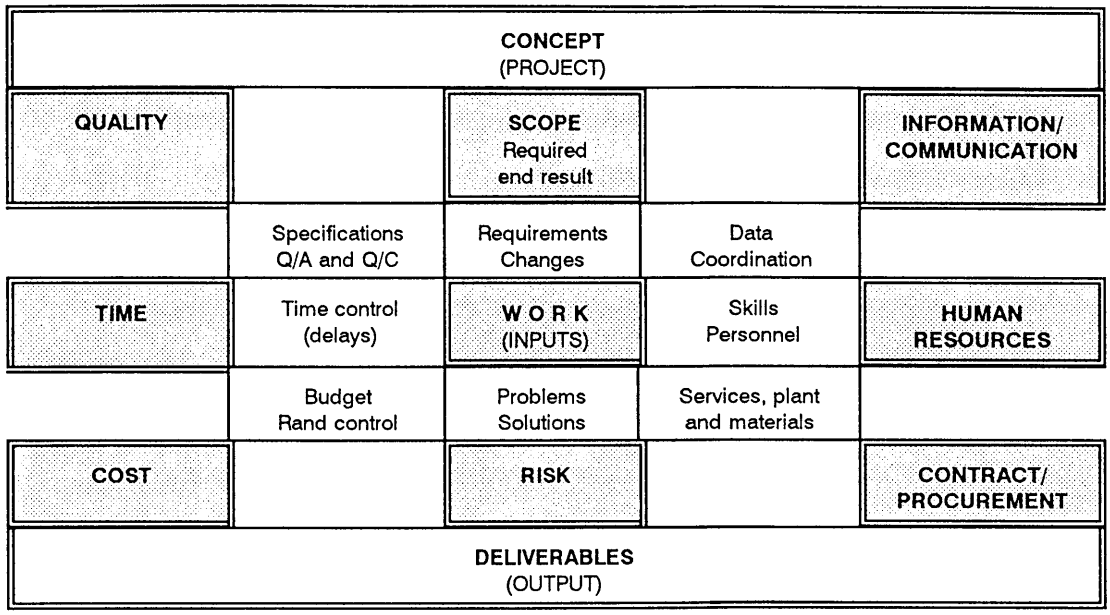
- **Information/communications management**. Control of projects requires the development of a plan, collecting information on the status of the work at any given time, comparing it to the plan and, if necessary, taking appropriate corrective action. Consistent and accurate feedback from both internal and external sources is important.

Although the functions of project management can be divided into core and facilitating functions, it should again be noted that the functions are interrelated and mutually supportive. Cockfield (1987: A-1) therefore argues that, in order for the objectives of a project to be achieved, the functions

be employed in an integrated manner.

Figure 2.3.7 illustrates this integrative nature of the functions in order to produce the required output (Wideman, 1991: II-8 after Quaife).

Figure 2.3.7: Work as an integrator



Source: Wideman, R.M. after Quaife, C. 1991. *A framework for project and program management integration*, The PMBOK handbook series - No. 1. Figure II.3. p. II-8.

Proposition 38:
A success factor in the implementation of formalized project management is the application of the integrated core and facilitating project management functions.

2.3.12 The project environment

2.3.12.1 Internal interfaces

Wideman (1991: V-1) notes that it should be clear from the generalized definition of a project that projects differ in their nature and size and that the internal environment in each varies accordingly. The internal environment is generally reflected in answers to the following questions: what, where, when, why, who, how and how much?

Referring to effective internal strategies, Wideman (1991: V-4) notes that through practical experience, a number of prerequisites for project management success can be identified. While these prerequisites do not necessarily guarantee success, their absence may well lead to sub-optimal results, if not outright failure of the project. The prerequisites are:

- **Executive support**. The executive must clearly demonstrate support for the project management concept by active sponsorship and control.

- **External authority**. The project manager must be seen as the authoritative agent in dealing with all parties and should be the single formal contact with them.

- **Internal authority**. The project manager must have the necessary managerial authority within his own organization to ensure response to requirements.

- **Commitment authority**. The project manager must have both the responsibility and authority to control the commitment of resources, including funds, within prescribed limits.

- **Involvement in all major decisions**. No major technical, cost, schedule or performance decision should be permitted without the project manager's participation.

- **Competence**. The project manager, his supporting team members, and other functional personnel assigned to the project should all be competent.

- **Project team**. The project manager should provide an input into the assembly of the project team to assure competence and further help in obtaining their personal commitment, support and required quality of service.

- **Management information system**. An effective project-oriented information and control system must be in place.

Finally, Wideman (1991: V-3) argues the need for the project manager to influence the project's internal cultural environment for the benefit of all the project participants. Every project team member and every member of the workforce should be persuaded to convey a caring attitude. All decisions and actions should be designed with a view to making the participants' experience better than it would have been, had the project not been implemented.

The focus of project management should thus be on the enhancement of the quality of each participant's experience at every stage of the project. The project's cultural environment may be improved by the training of personnel.

Proposition 39:
A success factor in the implementation of formalized project management is top-level management commitment and support for the project management concept.

Proposition 40:
A success factor in the implementation of formalized project management is the authority of a project manager to make final decisions, control committed resources and enforce compliance with requirements.

Proposition 41:
A success factor in the implementation of formalized project management is an effective project-oriented management information and control system.

Proposition 42:
A success factor in the implementation of formalized project management is the enhancement of the quality of each project participant's experience through all stages of the project life cycle.

2.3.12.2 External interfaces

Wideman (1991: VI-1) argues that the linkages of a project to its external environment are as important to the eventual outcome of the project as controlling the events within the project organization. The focus of the project manager is therefore not just confined to internal considerations but should also be outward looking.

A project's external environment involves forces outside the project. It includes the technology (the knowledge base from which it must draw), the customers and competitors, geographical settings, economic and political conditions, and even other projects. These factors and, in particular, changes in them may significantly affect the project process and its consequent success.

Generally, the more a project is dependent on the external environment, the greater the degree of uncertainty. However, the extent and mix of linkages will however vary from project to project. The purpose in analyzing the external forces is to define potential problems, assess the probability of their occurrence and solve them ahead of time. These issues are largely addressed within the project management function of risk management.

Wideman (1991: VI-2) lists some typical external environment influences of which the project manager and his team must constantly be aware, which may impact on the progress and ultimate success of the project. These external influences are:

- **Sponsor expectations**. Ensuring that the specified project objectives are congruent with the real project needs is an important prerequisite when the sponsor is represented by more than one group with differing perspectives within the sponsor's own organization.

- **Financial/economic conditions**. The viability on which the success of the project was predicted may change during the life of the project and may consequently require modification of objectives.

- **Technological/industrial conditions**. These may impact on the progress and effectiveness of the project process.

- **Legal and regulatory requirements**. These will impact on any goods or services which are contracted externally as well as the conduct of internal activities, such as the codes of conduct in response to environmental concerns.

- **Political implications**. These may be indirect or more obscured but may have a major impact, such as the change of a government at any level.

- **Health and safety standards**. These must be observed and, if well maintained, could have a favourable effect on project morale, progress and quality.

- **Natural environment protection**. The recognition that natural resources are finite and must be protected and conserved is important in the ultimate acceptability of infrastructure-type projects.

- **Changing workforce**. The workforce mix in terms of women, minorities and immigrants as well as educational levels and knowledge skills is changing.

- **Social responsibilities**. The recognition of shifting needs, such as reducing risk, providing interesting work, and improved opportunities, is important.

- **Ethical issues**. Hidden information, exposure of unacceptable practices of bribery or corruption are not acceptable to the information-conscious public. Honesty and integrity are of prime importance to the success of a project and to the ability to stand the scrutiny of both peers and society once the project is completed.

- **Project management knowledge**. The knowledge base is continually expanding similar to other disciplines and project managers have an obligation to remain current in both the art and science of project management.

Proposition 43:
A success factor in the implementation of formalized project management is a sensitivity to the environmental influences which may impact on the progress and ultimate success of the project.

Wideman (1991: VI-3) suggests that just as developing the right attitude was the means of influencing the project's internal cultural environment, so it should also be for developing a sound external stakeholders' environment. He states that:

> " ... this attitude is best reflected by adopting a mind set that reverses the traditional organization chart hierarchy. In other words, place the project stakeholders at the top of the chart, followed by the front-line project team members, and on down to the project manager at the bottom. Perhaps the project team will then better visualize their truly service orientation, designed to serve the best interests of a successful project outcome, both perceived and in reality."

A technique suggested by Wideman (1991: VI-5) for effectively dealing with the project's external environment is to prioritize the various stakeholder linkages by conducting a stakeholder analysis. Such an analysis would first identify all the potential stakeholders who might have an impact on the project and then determine their relative ability to influence it. Stakeholders may be found in any of the following groupings:

- Those who are directly related to the project, such as suppliers of inputs, consumers of outputs, and all those involved in the project process itself.

- Those who have influence over the physical, infrastructural, technological, commercial/financial, socio-economic, or political/legal conditions.

- Those who have a hierarchical relationship to the project, such as government authorities at local, regional and national levels.

- Those individuals, groups and associations, who have vested interests, some even unrelated to the project, who see an opportunity to pursue their own ends, such as competitors and special interest groups.

Within each grouping, the stakeholders must further be rated by degree of significance according to their ability to influence the project outcome. Members of the project team should then accordingly prioritize their efforts in order to maintain healthy linkages designed to provide the greatest probability of ultimate project success.

Proposition 44:
A success factor in the implementation of formalized project management is to deal with the project's external stakeholders and their relative ability to influence the project process and ultimate project success.

Finally, Nicholas (1990: 37) notes that projects and the application of project management vary, depending on the environment. He explains the

significant differences in project management practice in the environments classified by Roman (1986). These environments and their differences are:

- **Commercial/For-profit project management**. The end-item is a clearly defined product or service often customized or one-of-a-kind, to satisfy a customer or an internal requirement. Motivation and success criteria are heavily profit-oriented. The project manager guides the project through its entire life cycle, coordinating efforts of the project team with functional areas, subcontractors and vendors. Close contact with the customer is maintained and top-level management are informed of the progress towards project and profit objectives. Once the project is completed, the group is dissolved.

- **Government and nonprofit project management**. Grouped together, these project environments differ from commercial activities in the following ways:
  - There is no profit incentive and economic factors tend to be less important. Project managers in these environments are frequently reassigned during projects, which causes problems with administrative continuity. In government work, the continuity of projects depends heavily on political considerations since funding is legislatively appropriated.
  - Many projects focus on the evaluation or testing of products or services since virtually all budgeted funds are spent on procuring products or services developed by commercial vendors. Where the design and development work is performed by contractors, the project manager's role is largely administrative. Here the project manager oversees and coordinates multiple, related projects that may be components of a larger system. The project manager may have little control over technical matters but is responsible for checking on the contractors' progress.

- **Military project management**. Like government projects, these may involve testing and evaluating hardware developed by contractors. Major criteria for evaluating projects are technical and political. Costs are of lesser importance and profit is not a consideration.

Many organizations operate in multiple project environments (i.e. in government/nonprofit, military and commercial environments) and utilize a variety of integrators, such as matrix managers, project/program managers, project expediters/coordinators, and task forces/teams as discussed in section 2.3.10.4.

Proposition 45:
A success factor in the implementation of formalized project management is the acceptance of differences in project management practice in commercial and nonprofit/government project environments.

2.3.12.3 Trade-off analysis in the project environment

Kerzner (1992: 853-857) explains the need for trade-off analysis in a project environment. He suggests that successful project management is both an art and a science whereby the resources of an organization are controlled within the constraints of time, cost and performance.

However, projects are, by definition, non-routine, non-repetitive and unique activities where previous standards do not readily exist. Projects are further constantly influenced by occurrences in both the internal and external environments. The project manager must therefore continually pursue a delicate balance (or change the emphasis on attaining different goals at different stages of the project life cycle as noted by Kloppenborg & Mantel, 1990: 13) to attain the desired performance within the constraints of time

and cost. Trade-off analysis is thus an ongoing effort throughout the life cycle of a project. While cost and time deviations from the original estimate are normally overruns, a performance error is typically an underrun.

Trade-off analysis is based on the constraints of the project. The different options available are shown in table 2.2. Situations A and B are typical trade-offs that occur in the project environment. Where all constraints are fixed (situation C-1), no outcome other than the highly unlikely, total success is implicated. When all constraints are variable (situation C-2), there are actually no constraints and thus no need for trade-off analysis. It should be noted that it is not always possible to sacrifice one constraint without inducing an effect on the remaining two constraints.

Table 2.2: Options available for trade-off analysis

(A) ONE ELEMENT FIXED AT A TIME			
	TIME	**COST**	**PERFORMANCE**
A-1	FIXED	VARIABLE	VARIABLE
A-2	VARIABLE	FIXED	VARIABLE
A-3	VARIABLE	VARIABLE	FIXED
(B) TWO ELEMENTS FIXED AT A TIME			
	TIME	**COST**	**PERFORMANCE**
B-1	FIXED	FIXED	VARIABLE
B-2	FIXED	VARIABLE	FIXED
B-3	VARIABLE	FIXED	FIXED
(C) THREE ELEMENTS FIXED OR VARIABLE AT A TIME			
	TIME	**COST**	**PERFORMANCE**
C-1	FIXED	FIXED	FIXED
C-2	VARIABLE	VARIABLE	VARIABLE

Source: Kerzner, H. 1992. *Project management: a systems approach to planning, scheduling and controlling*. Van Nostrand Reinhold. Table 16-1. p. 856.

Finally, Kerzner (1992: 857-858) cautions that any process of managing time, cost and performance trade-offs should emphasize the systems approach to management by recognizing that a small change in one element of a project could have a major effect on all or only some of the other systems in the organization.

Proposition 46:
A success factor in the implementation of formalized project management is the need for and ability to perform trade-off analysis to attain the desired performance within the constraints of time and cost.

2.3.13 Successful project management

2.3.13.1 Project success

A project may be considered successful when the project objectives, which commonly involve the dimensions or constraints of time, cost and performance, are satisfied (Ward, Curtis & Chapman, 1991: 345). Kerzner (1992: 6) proposes that, in addition to these criteria, project success is further implied by customer or user acceptance, when few or mutually agreed upon scope changes take place, and when little interruption in the main work flow of the parent organization occurs.

Project management may make trade-offs between objectives and, if these are mutually agreed upon by the developer and user, a project may still be considered successful even if portions of the original objectives were not met (Bresnen, 1991: 258).

Some organizations therefore measure project success by considering only the highest priority criteria and attach a lesser importance to other

measures. Projects which do not satisfy all criteria are therefore not necessarily regarded as project failures.

The triple constraint view of project success (budget, schedule and performance) alone can therefore not be regarded as an absolute accurate barometer of project success (Sidwell, 1990: 177).

The best overall criterion for project success advocated by Nicholas (1990: 472) is satisfying the expectations of all the parties involved. Should the user, project manager and the developing organization feel that their expectations were met or exceeded, the project should on most accounts be considered a success.

Wideman (1991: VIII-1) further explains the rationale behind participant satisfaction. Some dimensions, like cost or time, may be measured objectively to determine the success of a project. Others, however, are a matter of personal subjective judgment or opinion. Pinto and Pinto (1991: 15) also refer to these other dimensions as intangible psycho-social outcomes. For a favourable opinion to be formed, those associated with the project must be reasonably satisfied with the final outcome.

In an adaptation from Pinto by Quaife and Wideman (1991: VIII-1), a view of project success (illustrated in figure 2.3.8) which includes both the internal and external project environments, is suggested.

Figure 2.3.8: The success target

INTERNAL TRACKING		EXTERNAL TRACKING			
STEERING PROJECT THROUGH PROJECT LIFE CYCLE					
	QUALITY	SCOPE	VIABILITY	COMPETITIVE	
INTERNAL PERFORMANCE		PROJECT SUCCESS			EXTERNAL PURPOSE
		PARTICIPANT	SATISFACTION		
	TIME	COST	USE	EFFECTIVE	

Source: Adapted from Pinto, J. by Quaife, C. & Wideman, R.M. 1991. *A framework for project and program management integration*. The PMBOK handbook series - No. 1. Figure VIII-1. p. VIII-1.

Pinto and Prescott (1988: 7) conclude that project success comprises three basic dimensions. In a contributing letter to Wideman (1991: VIII-3), Pinto further illustrates these dimensions in tabular form (see table 2.3).

Table 2.3: Project success measures

PROJECT SUCCESS MEASURE	COMPRISED OF:	AS PERCEIVED BY:
IMPLEMENTATION PROCESS	Internal efficiency: Conformance to scope, quality, schedule and cost requirements	Project team
PERCEIVED VALUE	Positive impact and potential for clients to improve performance	Project team and clients
ACCEPTANCE AND USE	Acceptability to clients and actual usefulness	Clients

Source: Wideman, R.M. 1991. *A framework for project and program management integration*. The PMBOK handbook series - No. 1. Table VIII-3. p. VIII-3.

Proposition 47:
A success factor in the implementation of formalized project management is the accurate definition of project success, which includes achievement of project objectives and overall participant satisfaction.

2.3.13.2 Project failure

Nicholas (1990: 463) suggests that no failure occurs in isolation. All failures are actually system output failures where defects or other features in the system itself cause or allow the particular failure to occur.

Some failures are unavoidable by reason of their being outside any of the participants' ability and judgement to anticipate, avoid or influence (Skitmore, Stradling & Tuohy, 1989: 103). They occur as a result of forces that are neither foreseeable nor controllable. Nicholas (1990: 464) argues that most failures are, however, caused by defects in (1) the project and user organization or (2) the project end-item. Examples of project failures are when a result that is perceived as desirable is not produced or when the cost, schedule, performance, quality, safety or other related objectives are not met.

Nicholas (1990: 465-471) identifies fourteen factors which, as inadequacies or defects in project management, may be regarded as sources of project failure. Figure 2.3.9 illustrates the project management causes of failure. The factors are categorized into the following three levels:

- **Level I**: Failures in the project management context. The sources of failure are traceable to the inappropriate fit (incongruent or incompatibility) of the project organization to the project objectives,

project tasks, top-level management and the larger environment. The failures include:

- An inadequate project management model. Incorrect organizational structure, project manager, or project team is selected to meet the requirements of the project.
- Unsupportive top-level management. Top-level management do not give the active and continued support necessary to achieve the project goals.

Figure 2.3.9: Project management causes of failure

LEVEL I: PROJECT MANAGEMENT CONTEXT			
(1) Inappropriate project management approach		(2) Unsupportive top management	
LEVEL II: PROJECT MANAGEMENT SYSTEM			
(3) Wrong project manager	(4) Failure to use systems approach		(5) Misuse of management techniques
LEVEL III: PLANNING AND CONTROL PROCESS			
CONCEPTION	DEFINITION	ACQUISITION	OPERATION
(6) Inadequate communication			
(7) Noninvolvement of user			
(8) Inadequate planning			
(9) Inadequate definition			
(10) Bad estimating			
(11) Incorrect scheduling/resources			
(12) Numerous changes			
(13) Inadequate control			
(14) Poorly planned termination			

Source: Nicholas, J.M. 1990. *Managing business and engineering projects: concepts and implementation*. Prentice-Hall, Inc. Figure 18-2. p. 466.

- **Level II**: Failures in the project management system. The sources of failure are traceable to project leadership, philosophy and practice, and

include:

- The wrong project manager. The person in the role of the project manager does not have the background, skills, experience or personality to lead the project.
- Ignoring the systematic nature of projects. The project is not managed as a system. The elements and processes of the project through the project life cycle are compartmentalized without regard for their interaction.
- Inappropriate use or misuse of project management techniques. The techniques are misunderstood, not accepted or not properly employed.

■ **Level III**: Failures in the planning and control processes. The sources of failure involve the planning and control processes, and include:

- Inadequate communication in the project. The problems stem from lack of information quality, accuracy, timeliness, collection and documentation, or inadequate distribution of information to the project participants.
- Failure to involve the user. The user or customer does not participate in the planning/definition/design/implementation process and user needs are therefore disregarded.
- Lack of or inadequate project planning. Analysis of how and when things will be done is insufficient and reports and/or recommendations from previous projects are ignored.
- Inadequate project definition. Vague, wrong, misleading or no project definition causes failure. There is no formal definition of technical requirements, tasks or project scope.
- Incorrect estimating of time and resources. Estimates of resource requirements, activity durations and completion dates are incorrect or unrealistic.
- Incorrect scheduling and handling of the resources. Schedules and

allocation of the resources are incorrect, resource skills or capabilities are unknown and there are no reserves or backup resources.

- Numerous changes during the acquisition phase. Changes are made to the original estimate without corresponding adjustments to the schedule, budget or other elements of the plan.
- Inadequate control. Problems are not anticipated before they occur, control is focused on daily issues without looking forward to potential problem situations.
- Project termination is poorly planned. It is not known what constitutes project completion or the end-item, what the acceptance criteria are, or how the project must be signed off.

Nicholas (1990: 471-472) further explains that a defect or inadequacy at one level may have a negative impact on the next lower level. A hierarchy of effects is implied and defects or problems at higher levels increase the chance of project failure even when there are no defects at lower levels. Emphasis should thus be placed on higher levels because, in general, it would help to eliminate or mitigate problems at lower levels.

The factors identified are not universal verities and their validity and importance should be weighed and assessed uniquely on a project-by--project basis. It should further be noted that the absence of failure factors does not necessarily mean success. Not having the factors will reduce the chance of failure but will not guarantee success, however.

Wideman (1991: C-3) identifies certain traps which should be avoided when the project management approach is utilized. The traps include possible disorganization and disruptive conflict which may result; special leadership skills are missing; project management knowledge is missing; trade-offs are not understood; timely decisions are not made; and an appropriate

cultural environment is not established.

Kerzner (1992: 513-514) also identifies certain major causes of project management failure. These causes are similar to those listed by Nicholas (1990).

Proposition 48:
Success barrier factors for the implementation of formalized project management are failures in the project management context, i.e. inappropriate selection and unsupportive top-level management of the project management approach.

Proposition 49:
Success barrier factors for the implementation of formalized project management are failures of the project management system, i.e. unsuitable project manager, disregarding the systematic nature of projects, and misuse of project management techniques.

Proposition 50:
Success barrier factors for the implementation of formalized project management are the failures in the planning and control processes, i.e. lack of communication, user not involved, inadequate planning and control, poor project definition, unrealistic estimates, insufficient resources, numerous changes, and termination not planned.

2.3.13.3 Successful project management

Project success is not necessarily equal to company, organizational or even project management success. Only when a continuous stream of

successfully managed projects occurs can mention be made of excellence (Holt, 1989: 234) in project management (Kerzner, 1992: 7).

Kerzner (1992:3) defines successful project management as having achieved the project objectives: within time, within cost, at the desired performance/technology level while utilizing the assigned resources effectively and efficiently.

Nicholas (1990: 472-477) identifies some characteristics which may be associated with project management success. The characteristics, illustrated in figure 2.3.10, are classified into the following three categories:

- **Project participants**. For a project to be successful, it needs strong commitment (also see Rossy & Archibald, 1992: 5) from all the participants to fulfil the project objectives. The commitment and involvement of the following participants are specifically implicated:
  - Top-level management. Their commitment is essential for project success because it affects the level of acceptance or resistance from others to the project.
  - Project manager. The project manager should be committed to meeting the time, cost, safety and quality goals.
  - Project team. The whole team should be involved in problem solving and decision making.
  - Users. The project team should identify and understand the user's requirements before the project begins. The user should be strongly committed to the project goals and be involved in the project management process until final approval of the installed end-item.

Figure 2.3.10: Project management causes of success

PROJECT GOALS				
TIME	COST	PERFORMANCE	QUALITY	SAFETY

PROJECT PARTICIPANTS			
TOP MANAGEMENT	PROJECT MANAGER	PROJECT TEAM	USER/CLIENT
COMMITMENT			
Support	Authority Skills	Skills Technology Teamwork	Authority Approval
INVOLVEMENT			

COMMUNICATION AND INFORMATION SHARING	
Timely meetings/reports Basis for action Continuous	High quality Open access Participation

PROJECT MANAGEMENT AND SYSTEMS DEVELOPMENT			
DEFINITION	PLANNING	CONTROL	IMPLEMENTATION
Clear Well understood Stable Quantitative Qualitative	Scope definition Schedules Budgets Resources Milestones Risks	Monitoring Feedback Troubleshooting Proactive Minimal changes	Advanced preparation Stopping point Follow-up Audit/evaluation

Source: Nicholas, J.M. 1990. *Managing business and engineering projects: concepts and implementation*. Prentice-Hall, Inc. Figure 18-3. p. 473.

- **Communication, information sharing and exchange**. Good communication implies a mechanism for effectively integrating the efforts of the project participants and facilitating project management and the systems development process. There should be continuous communication between all personnel within the project/user/top-level management team.

- **Project management and systems development**. The factors that relate to project management functions and the elements of the system

development process are:

- Project definition. There should be complete and clear definition of the project scope, objectives and work to be done. Project responsibilities and requirements are clearly defined and well understood by everyone involved.
- Project planning. There should be thorough planning followed by executing the plan with strong management control. Plans are related to time, cost and performance goals. Plans provide detailed descriptions of the work and the stages of the project as well as ways to measure performance and arrangements for project control.
- Project control. The project should have good control and reporting systems. The system provides for monitoring and feedback at all stages and enables assessment and comparison of schedules, budgets and team performance with project goals. The control system should be proactive and forward looking in order to anticipate problems, foresee and forestall them and then react as problems arise.
- Project implementation. Preparation for implementation is done in advance in the initial plan and throughout the project.

Slevin and Pinto (1986: 57) identified a number of factors which are critical to project success. The factors are categorized into those generally within the control of the project team, and those considered beyond the control of the project team. Beale and Freeman (1991: 25) labelled the first, endogenous variables and the second, variables exogenous to the project and project team.

■ Factors **within the control** of the project team:

- Project mission: initial clarity of goals and general directions.
- Top-level management support: willingness of top-level manage-

ment to provide the necessary resources and authority/power for the project.

- Project/schedule plan: a detailed description of the individual action steps required for implementation.
- Client consultation: communication, consultation and active listening to all affected parties.
- Personnel: recruitment, selection and training of the necessary personnel for the project team.
- Technical tasks: availability of the required technology and expertise to accomplish the specific technical action steps.
- Client acceptance: selling the final product to its ultimate intended users.
- Monitoring and feedback: timely provision of comprehensive control information at each stage in the implementation process.
- Communication: the provision of a suitable network and necessary data to all key actors in the project implementation.
- Anticipating problems: ability to deal with unexpected crises and deviations from the plans.

■ Factors **outside the control** of the project team:

- Characteristics of project team leader: the competence of the project leader by way of administrative, interpersonal and technical abilities, and authority available to perform duties.
- Power and politics: the degree of political activity within the organization and the perception of the project as furthering an organization member's self-interest.
- Environmental events: the likelihood of external organizational and environmental factors impacting on the operations of the project team either negatively or positively.
- Urgency: the perception of the importance of the project or the need to implement the project as soon as possible.

Finally, Kerzner (1992: 509-510) lists the following actions which can be taken by the project manager and project team to stimulate project success:

- Key team members with proven track records in their respective fields should be selected.
- Commitment and a sense of mission should be developed from the outset of the project.
- Sufficient authority should be granted and a project-oriented organizational form utilized.
- Good relationships should be maintained with the client, parent organization and project team.
- The public's image of the project should be enhanced.
- Key members should assist in decision making and problem solving.
- Realistic cost, schedule and performance estimates and goals should be developed.
- A team structure that is appropriate yet flexible should be provided.
- Means other than formal authority should be used to maximize influence over people and key decisions.
- A workable set of project planning and control tools should be employed.

- The importance of meeting cost, schedule and performance goals should be emphasized but priority given to achieving the mission or function of the end-item.

Proposition 51:
A success factor in the implementation of formalized project management is acquiring the commitment and involvement of all key project participants.

Proposition 52:
A success factor in the implementation of formalized project management is communication, information sharing and exchange by all key project participants.

Proposition 53:
A success factor in the implementation of formalized project management is a clear project definition and effective project planning, control and implementation.

2.3.13.4 Project force field analysis

An approach for improving the project performance advocated by both Kerzner (1992: 517) and Nicholas (1990: 477-480) entails force field analysis. The technique was originally developed by Kurt Lewin in 1947 as a means of overcoming resistance to change. It may also be used in project management, however, to investigate forces acting on a current project or forces that might influence an upcoming project and to determine where emphasis is needed to increase a project's likelihood of success.

The method is based on the assumption that at any point in the life cycle of a project forces exist which will either drive a project towards success or restrain a project and induce failure.

In a steady environment, the driving (or facilitating) and restraining forces are in balance or equilibrium. Whether the forces act independently or in combination, should the driving or the restraining forces increase, changes in the state of affairs are likely to occur.

Most of the forces affecting project performance are potentially either facilitating or restraining. This means that a factor could be a restraining force when absent but a facilitating force when present. However, the influence of a force depends on how strong and visible it is. Not all forces are of equal importance or influence. Forces are further independent and some tend to impact on other forces.

The method of force field analysis identifies all the restraining and driving forces in a situation and determines the relative strength of each. It is then possible to discover which restraining forces should be weakened or, by the same token, which driving forces must be strengthened to move the situation towards the ideal state, the equilibrium.

Project managers operate in a dynamic environment in which constant and rapid change becomes a way of life. To operate effectively under these circumstances, the project manager must be able to diagnose the situation, design alternative courses of action, provide the necessary leadership so that changes can be implemented, and develop an atmosphere that helps employees to adapt readily to these changes.

Nicholas (1990: 478) notes that the factors that cause project management to succeed or fail (see subsections 2.3.13.2 and 2.3.13.3) encompass most

of the forces which influence project performance. Kerzner (1992: 518-522) provides a brief synopsis of a research study by Dugan, Thamhain and Wilemon (1977) in which information on the forces in project environments was obtained. Driving forces were identified in the areas of personal drive; individual and team motivation; leadership; management and functional support; technical expertise; project objectives; financial resources; and client support and commitment.

Proposition 54:
A success factor in the implementation of formalized project management are the driving forces of project success, that is personal drive, motivation and leadership, management and functional support; technical expertise; project objectives; financial resources; and client support and commitment.

2.3.13.5 Advantages of project management

Wideman (1991: C-3) and Kerzner (1992: 145) identify the following potential advantages to be attained through the application of the project management approach:

- Improved scope definition for the project with a results orientation.
- Optimization of the allocation and use of resources.
- Greater quality conformance and reliability.
- Reduced cost and time with higher profit margins, where applicable.
- Improved risk handling and better control.

- Increased individual morale, greater team spirit and better mission orientation for employees working on the project.

- Increased visibility of the project with better customer relations.

- Improved functional integration and coordination amongst divisions with a higher chance of project success.

- Accelerated development of managers due to breath of project responsibilities.

Kerzner (1992: 3) suggests that the potential benefits from project management are also:

- Functional responsibilities ensure that all activities are identified and accounted for regardless of personnel turnover.

- The need for continuous reporting is minimized.

- The time limits for scheduling are identified.

- A methodology for trade-off analysis is identified.

- Accomplishment against plans is measured.

- Problems are identified timeously and corrective actions follow.

- Estimating capability for the future is improved.

Proposition 55:
Success factors for the implementation of formalized project management are the perceived advantages of project management; i.e. optimization of resources, greater quality conformance, improved risk handling and better control, increased visibility of the project with better customer relations, and improved functional integration with a higher chance of project success.

2.3.13.6 Disadvantages of project management

Kerzner (1992: 145) lists the following major company or organizational disadvantages of project management:

- Internal operations are more complex and difficult to manage.
- Organizational policies are not applied consistently.
- There is a possible lower utilization of personnel by shifting personnel from project to project and duplicating of functional skills in project organization.
- Higher program costs may result in lower profit margins, where applicable.
- There is a tendency for functional groups to neglect their job and let the project organization do everything.

Proposition 56:
Success barrier factors for the implementation of formalized project management are the perceived disadvantages of project management; i.e. more complex internal operations, inconsistent application of organizational policies, lower utilization of personnel.

2.3.14 Applications and forms of project management

2.3.14.1 Criteria for the application of project management

Nicholas (1990: 30) suggests that, although project management may have originated in the construction and aerospace industries by reason of their environments and kind of activities which demand flexible and imaginative forms of management, other industries and environments may also find the application of project management beneficial. He identifies two general conditions which, when present, would suggest that project management be applied:

- The more unfamiliar or unique the undertaking, the greater the need for project management to ensure successful completion.

- The more numerous, interdisciplinary and interdependent the activities of the undertaking, the greater the need for project management to ensure coordination, integration and successful completion.

Cleland et al (1983) identify five general criteria to be considered when deciding whether or not project management is appropriate. Nicholas (1990: 30- 31) further elaborates on these criteria as follows:

- **Magnitude of the effort**. When a project requires more resources than

are normally employed by an organization, or coordination and integration of resources are required over several functional areas, project management techniques may be necessary.

- **Unfamiliarity**. Projects are, by definition, something different from the ordinary and routine.

- **Changing environment**. Environments which change rapidly or are characterized by high innovation, shifting markets and consumer behaviour, present new "opportunities" for organizations. These organizations must be creative, innovative, flexible and capable of rapid response.

- **Interrelatedness**. Should the project require a joint effort between different functional areas, lateral relationships which expedite work and reconcile the conflicts inherent in multifunctional undertakings, project management can link together and coordinate the efforts of areas within the parent organization as well as the efforts of outside contractors, vendors and customers.

- **Reputation of the organization**. The stake of the undertaking may necessitate project management. If failure to complete the project satisfactorily would result in either financial loss, damaged reputation or loss of future contracts (the stake and consequences of failure are thus high), project management may, through integrative planning and control, provide a better chance for successful completion.

By contrast, however, the more familiar the undertaking, the more stable the environment; the less unique and more standardized the end-item and the lower the stake, the less need there is for project management.

Stuckenbruck (1981: 17-18) suggests that, by examining the characteristics of a particular effort, it may be determined whether the application or conduct of project management would be appropriate or not. The application of project management is appropriate when:

- The project meets the definition of a project proposed by having defined objectives which are to be achieved that will signal completion.
- The project is large, technically complex, and new technology is incorporated that is unique or relatively rare.
- Time and cost are critical while resources are limited and must be shared between organizational units.
- Specific ad hoc opportunities or problems must be dealt with.
- Results are critical or especially important and the project has strong top-level management support.
- Coordination across functional boundaries as well as goods and services from outside are required.
- Single point responsibility and reporting and single point representation to the customer are required.
- Quick response to changing conditions is necessary with a minimum organizational disruption.
- Multiple regulatory approvals are required and should be coordinated.
- Many other concurrent projects exist in the organization.

By contrast, Cleland (1990: 51) identified situations where project management should not be used. These are when:

- The business products or services are highly standardized.
- The production processes are routine or seldom change.
- The traditional organizational framework is effective in making strategic and key operating decisions.
- The technology is stable and well within the state of the art.
- The political, social, economic, technological and competitive environments are stable.
- Projects are not an integral part of the organization's operations and do not require project management techniques.
- The entity is small and the same results can be accomplished through the functional organization, even though informal project management techniques may be used.

Proposition 57:
A success factor in the implementation of formalized project management is an unfamiliar undertaking of large magnitude where many interdisciplinary and interdependent activities must be coordinated and integrated over functional divisions.

Proposition 58:
A success factor in the implementation of formalized project management is integrative planning and control where consequences of failure are high; i.e. financial loss and damage to the reputation of the organization.

2.3.14.2 Industry application of project management

Project management has found diverse application (Welsh, 1992: 5) and is used in many different industries or technologies. Wideman (1991: C-2) lists some of the industries as presented in table 2.4.

Table 2.4: Project management industry application

■ Aerospace	■ Agriculture/foods
■ Amusements/museums/zoos	■ Automotive
■ Banking/finance/insurance	■ Chemicals
■ Construction/real estate	■ Communications
■ Computers/hard & software	■ Defense/security
■ Design/instrumentation	■ Education
■ Electronics	■ Engineering
■ Government/civil service	■ Health/environment
■ Manufacturing	■ Marine/boats/ships
■ Media/printing/publishing	■ Mining
■ Petroleum	■ Pharmaceutical
■ Plastics & rubber	■ Pulp & paper/wood
■ Resource industries	■ Telecommunications
■ Transportation/land/sea	■ Textiles
■ Tourism/travel/hotel	■ Utilities/energy
■ Volunteer organizations	■ Wholesale/retail

Source: Wideman, R.M. 1991. *A framework for project and program management integration*. The PMBOK handbook series - No. 1. p. C-2.

Kerzner (1992: 27) identifies four types of industries where project management may generally be applied. The classification (see table 2.5) is based on the type of tasks (which vary from simple to complex) and operational environments (which vary from static to dynamic). Task complexity is seen as the key variable. Both C- and D-type industries have project management-related structures. Organizations that have complex tasks and operate in a dynamic operational environment normally find formal project management mandatory.

Table 2.5: Classification of industry types

TYPE OF INDUSTRY	TASKS	ENVIRONMENT
A	SIMPLE	DYNAMIC
B	SIMPLE	STATIC
C	COMPLEX	DYNAMIC
D	COMPLEX	STATIC

Source: Kerzner, H. 1992. *Project management: a systems approach to planning, scheduling and controlling*. Van Nostrand Reinhold. p. 27.

With informal project management, projects are managed on an informal basis by either a project manager, whose authority is minimized, or by the functional managers. These projects stay between one or two functional lines and communication is either unnecessary or informal.

When the size and complexity of activities grow to a point where they are unmanageable within the current organizational structures, organizations depart from informal project management and restructure in order to formalize their project management process. Kerzner (1992: 28) suggests

that, should any of the following conditions be present, some form of formalized project management may be necessary: complex tasks; dynamic environmental considerations; rigid constraints; many activities to be integrated; and several functional boundaries to be crossed.

Bresnen and Haslam (1991: 340) and Kerzner (1992: 29) argue that not all industries necessarily need project management. Industries with simple tasks, being in either static or dynamic operational environments (type A and B industries), usually have no need for formalized project management.

Kerzner (1992: 40) further distinguishes between project-driven and non-project-driven organizations. All organizations on a microlevel are either market, engineering or manufacturing-driven. On a macrolevel, however, they may be considered either project or non-project-driven. In project-driven organizations, everything revolves around projects (Dinsmore, 1993: 26) and each project is regarded as a separate cost centre with its own "profit or loss" statement. In non-project-driven organizations, profit and loss are measured on vertical or functional lines. Projects merely exist to support product or functional lines. Kerzner (1992: 40) further suggests that project management is generally more difficult in non-project-driven organizations because:

- Projects are few and far between.

- Not all the projects have the same project management requirements and cannot therefore be identically managed. There is also a poor understanding of project management and a reluctance to invest in proper training of personnel.

- Top-level management do not have sufficient time to manage all

projects but do not want to delegate authority to do so.

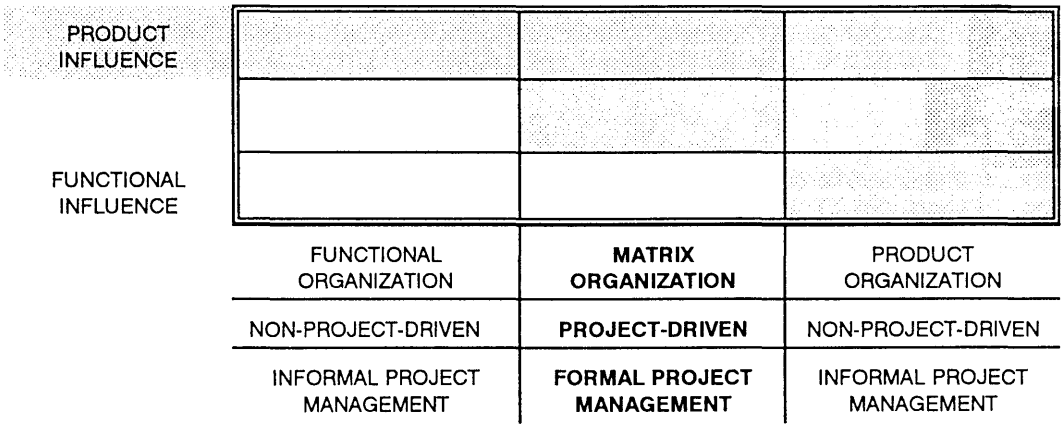
- Projects tend to be delayed because the vertical chain of command must be followed. Project work is delayed in functional departments.

- Only a portion of the organization understands project management and sees the system in action.

- There is a heavy dependence upon subcontractors and outside consultants or agencies for project management expertise.

Kerzner (1992: 42) illustrates the relationship between formal/informal project management, project/non-project driven organizations and organizational structures. From figure 2.3.11 it should be noted that:

Figure 2.3.11: The decision-making influence



Source: Kerzner, H. 1992. *Project management: a systems approach to planning, scheduling and controlling*. Van Nostrand Reinhold. Figure 1-18. p. 42.

- Informal project management is generally applied in non-project-driven organizations with either a functional (traditional) or pure

product/project organizational structure.

- Formal project management is generally applied in project-driven organizations utilizing a matrix organizational structure.

Proposition 59:
A success factor in the implementation of formalized project management is the ability to deal with complex tasks in either static or dynamic work environments.

Proposition 60:
A success factor in the implementation of formalized project management is a project-driven organization which uses a matrix organizational structure.

2.3.14.3 Different forms of project management

Project management is applied in many different forms. The project organization may also vary considerably depending on the nature of the project and the project environment. However, Nicholas (1990: 32-33) identifies two common features:

- A project team or project organization is created uniquely for the purpose of achieving specific project objectives.

- A single person, the project manager, is assigned the responsibility for seeing that the objectives are accomplished.

Beyond these common features, other aspects may differ depending on

the specific application. Nicholas (1990: 33-38) identifies five major forms of project management. The first form, known as "basic project management" refers to what is commonly understood by the concept of project management. The other forms are project management variants which are very similar to project management. The different forms identified are:

- **Basic project management**. The most common project approach places the project manager and functional managers at the same level. The project manager is given formal authority to plan, direct, organize, and control the project from start to finish. The project manager works directly with any level of the organization in any functional area to accomplish project goals. The assignment of resources, such as personnel and facilities, has to be negotiated with functional managers. Basic project management is implemented in two widely used forms:

  - **Pure project management**: A complete, self-contained organization is created with all the necessary functional elements within.

  - **Matrix management**: The organization is created by using elements allocated from permanent functional units. The project must share resources with other concurrent projects and with functional areas from which they are borrowed.

- **Program management**. Program management is used interchangeably with project management because of the similarity between programs and projects. Both work towards a target specified in terms of a desired product or service output, a date of accomplishment and a related budget.

- **New venture management**. Project management resembles a type of management used in consumer-oriented firms for generating new products or markets. A new venture team is created to find new products or markets that fit the specialized skills, capabilities and resources of the organization.

- **Product management**. It involves giving a single person the authority to oversee all aspects of a product's production, scheduling, distribution and sales. The product manager coordinates and expedites efforts of manufacturing, distribution and sales to ensure uninterrupted flow of the product from its production to its delivery to the customer.

- **Ad hoc committees and task forces**. For projects that are small or span a short duration, a temporary team is created, usually within a specific functional department or as a separate "arm" of the organization. The teams are called task forces or interdepartmental committees. A leader and the members for the ad hoc committee are selected whereafter the leader is responsible for expediting and coordinating the effort.

Finally, based on a classification by Davis (1962), Nicholas (1990:29) identifies four types of project managers. These are:

- **Project expediters**. These are individuals who speed up the work. Their purpose is to achieve unity of communications. They are not seen as managers but rather serve as translators of technical concepts into business concepts of costs, schedules, and markets. The expediter role is usually restricted to smaller projects with low risks and less stake.

- **Project coordinators**. They act as staff leaders and their purpose is to achieve unity of control over project activities. They have authority to control project matters and disbursements from budget, but still have no line authority over workers.

- **Matrix managers**. They perform the full range of management functions and, in addition to the purpose of unity of communications and control, have the authority to plan, motivate, direct and control project work. Their purpose is thus to achieve unity of direction.

- **Pure project managers**. They direct pure project organizations. Their purpose is to achieve unity of command. These managers are primarily integrators and generalists rather than specialists. They must balance technical factors with schedules, costs, resources and human factors. They deal with top-level and functional managers, vendors, customers and subcontractors.

For the purposes of this research, formalized project management is defined as and refers to the application of basic project management in the form of matrix management in government/nonprofit project environments. (See subsections 2.3.14.2, 2.3.14.3 and 2.3.12.2). The type of project manager implicated, is a matrix and pure project manager as defined in subsection 2.3.14.3.

2.3.15 Summary

Section 2.3 focused on the content-related issues of strategy formulation and implementation. The purpose was to describe the construct "formalized project management" (i.e. strategy formulation) and further to identify the tools for the implementation of formalized project management (i.e. strategy implementation).

In general, project management is concerned with the management of projects. A project is defined as any series of temporary, non-routine and non-repetitive activities which are undertaken to accomplish project objectives.

An integral part of a project is its life cycle. When divided into some logical phases of development, such as conceptual, development, execution and termination, the consistent application of management to all phases is enhanced.

The inherent characteristics of projects, as reflected by their complexity and uncertainty, necessitate that they be differently managed to simpler, ongoing, repetitive type operations. Project environments call for adaptability and rapid response to change. They require more organic and flexible forms of structure and management procedures.

Project management is defined as a systems approach to planning, organizing, leading and controlling human and material resources for the duration of a project established in order to achieve and complete the project objectives.

Project objectives must be specific, verifiable and attainable and stated in terms of budget (cost), schedule (time), performance (quality) and stakeholder's acceptance. A management-by-objective (MBO) approach may be utilized to achieve the all-embracing scope objective of a project.

The tools for the implementation of formalized project management are embodied in the three main elements of project management, namely the project manager, the project team and the project management system.

The different roles, responsibilities and authority of the project manager

determine the desired personal characteristics and important skill requirements. Skills in interface management and conflict resolution are viewed as critical elements of the leadership role required from the project manager.

The project team, with the project manager as team leader, consists of a combination of project office personnel and functional employees. Project office personnel provide support for the project manager while functional members are usually assigned to only some specific phase of the project. Roles outside the project team which are also important are the role of manager of projects and the role of top-level management.

The project management system should ensure that the project manager and project team perform effectively. A part of this system which provides for integrative planning and control is the organizational structure. While many different structures may be identified, the matrix form is deemed the most appropriate for project management. Conversion to such a new structure requires transitional management.

Eight project management functions may be distinguished. The four core functions of scope, quality, time and cost management lead to the specific project objectives but must be integrated with one another and with the project life cycle. The four facilitating functions of risk, human resources, procurement and communication management provide the means through which the objectives of the basic functions are achieved.

The project environment is composed of both internal and external interfaces. The internal environment reflects the events within the project organization. Linkages outside the project comprise the external environment.

Project success is implicated when the expectations of all the parties involved are satisfied. But project success is not equal to project management success. Only when a continuous stream of successfully managed projects occurs, can project management success be claimed. Several factors may either cause project management failure or project management success. Using the force field analysis technique, the forces which may influence projects may be identified and used to determine where emphasis is needed in order to increase the likelihood of success.

The characteristics of a particular effort are used to determined whether the application or conduct of project management is appropriate or not. Project management has found wide application in many industries and is further also applied in several forms. Generally, formal project management is applicable in project-driven organizations which utilize the matrix organizational structure.

Section 2.4 will describe the process-related issues of strategy formulation and implementation. The focus will thus be on how a strategy for formalized project management can be formulated and implemented.

2.4 MANAGEMENT OF ORGANIZATIONAL CHANGE

2.4.1 Introduction

In section 2.2, a content and a process perspective of both strategy formulation and implementation was presented. The content-related issues of strategy formulation and implementation (or what the strategy is and what the tools for implementation are) were described section 2.3. This section examines the process-related issues of strategy formulation and implementation. The focus is thus on how a strategy is formulated and how it is implemented. Included are the steps and procedures which need to be followed in order to formulate and implement a strategy for formalized project management in public sector work departments.

Connor and Lake (1988: 1) note that the hallmark of organizational and managerial life in the last decade of the twentieth century is change. Implementing a strategy requires change. It may thus be argued that the management of organizational change is an indispensable part of any proposed strategy to implement formalized project management in an organization (or in this case a public sector work department).

It should be noted from the outset of this section that the material included is largely based on the work of Connor and Lake (1988). Their general change management model is used as the basis for the development of an implementation strategy for project management which is an objective of this research. Incorporating significant portions of their work is thus a necessary prerequisite for the correct interpretation and application of their change management model.

In this third section of the literature review, the discussion of change or, more specifically, the management of organizational change commences

in subsection 2.4.2 with the presentation of a model in which a managed organizational change process is illustrated. Following the serial logic of this model, subsection 2.4.3 identifies some external and internal sources of change, subsection 2.4.4 describes the objects and methods of change and lastly, subsection 2.4.5 focuses on general strategies for change. Moving to more practical issues when conducting change, subsection 2.4.6 identifies the people who participate in the change process, subsection 2.4.7 describes the issues related to change policies while subsection 2.4.8 focuses on institutionalizing the changes or strategies. Subsection 2.4.9 presents the general change management model of Connor and Lake. This model, which incorporates a process perspective of strategy formulation and implementation, provides a foundation for the development of an implementation strategy for formalized project management in public sector work departments. Finally, subsection 2.4.10 summarizes section 2.4 of the literature review.

2.4.2 Managed organizational change process

Connor and Lake (1988: 4-5) distinguish between a "natural" and a managed organizational change process.

"Natural" organizational change is so called by reason of the natural process by which change starts and then progresses on its own to some conclusion, regardless of and without any management interference. This "natural" organizational change process, illustrated on the left hand side of figure 2.4.1 (the unshaded area), has the following principal characteristics:

- Destabilizing forces, which may originate from either inside or outside the organization, disrupt the status quo of the organization.

- Some form of organizational adjustment is needed to deal with the

effect of these forces. Without the guidance from management, the forms of adjustment develop according to custom or convenience or merely by impulsive reflex.

- Whatever form of adjustment is made, the result is a changed organization. Should these adjustments adequately deal with the destabilizing forces, the new and changed organization would be maintained. If not, the cycle would again begin and further organizational adjustments would occur.

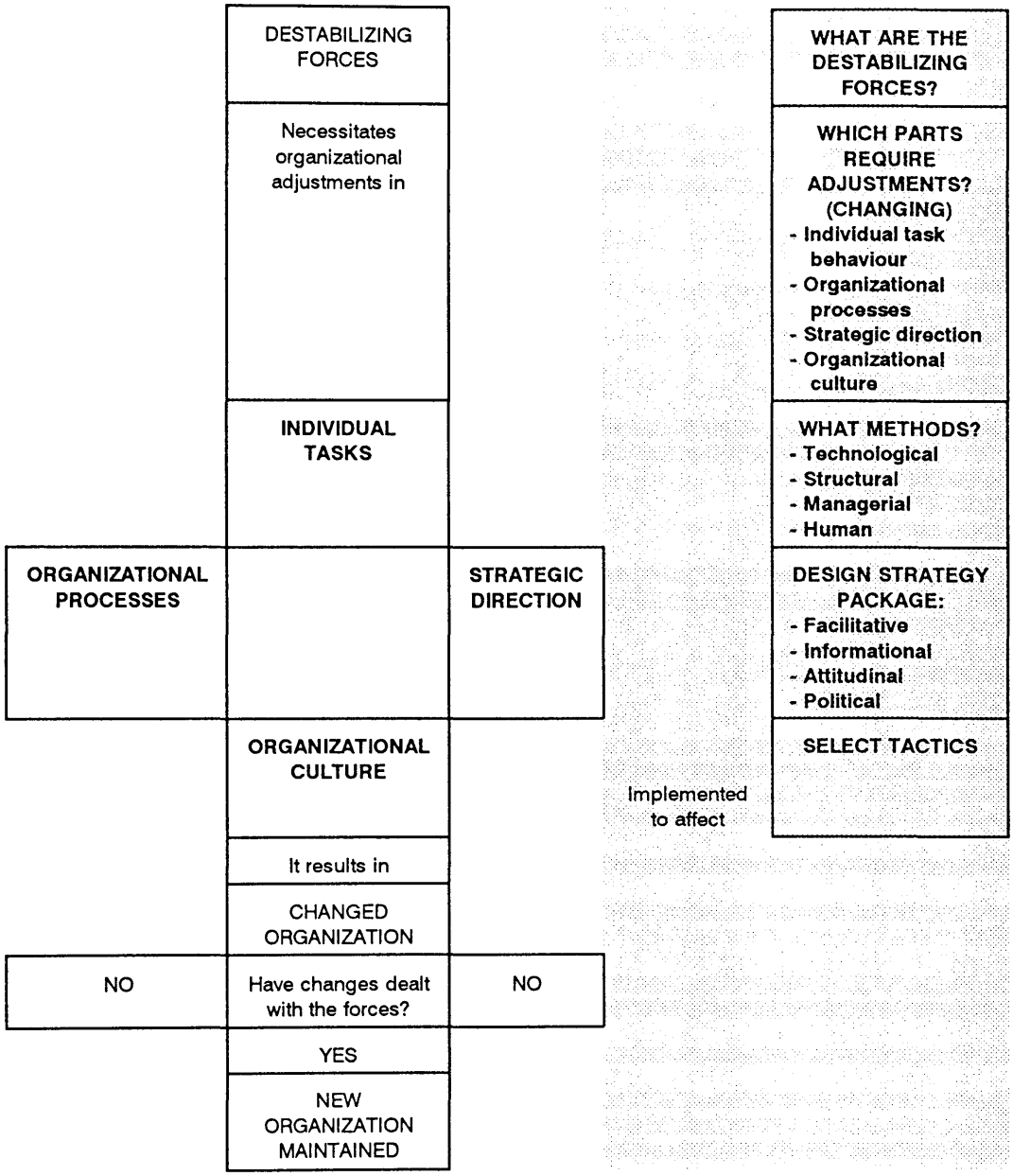
Connor and Lake (1988: 6-10) argue that this "natural" process of organizational change is not acceptable to management of change because a distinction must be made between change as a phenomenon and change as a set of purposeful actions. They propose a model whereby a management overlay is made on the "natural" change process. The model, illustrated in figure 2.4.1, includes the management overlay on the right hand side (the shaded area) of the figure and has the following characteristics:

- The identity, nature, and source of the destabilizing forces have to be diagnosed before change strategies can be selected. Sources of change are further described in subsection 2.4.3.

- Four major organizational properties may be the objects of change. They are the individual task behaviours, organizational processes, strategic direction and the organizational culture. The objects of change are further described in subsection 2.4.4.1.

- Four distinct methods of change are available. They are the technological, structural, managerial and human-oriented methods. The methods of change are further described in subsection 2.4.4.2.

Figure 2.4.1: A managed organizational change process



Source: Adapted from Connor, P.E. & Lake, L.K. 1988. *Managing organizational change*. Prager Publishers. Figure 1.2. p.6.

- The choice of the strategy most appropriate for accomplishing the change follows after the destabilizing forces have been diagnosed and the objects and methods of change selected. Four major strategies for conducting organizational change include the facilitative, informational,

attitudinal and political strategies. The strategies for change are further described in subsection 2.4.5.2.

- Change strategies are seldom used singularly but rather as part of a comprehensive strategy package. The following guidelines on a selected strategy package should be noted:
  - The design of the strategy package is an inherent part of change management. Without the express design of the package, the process of change may be haphazard or even random.
  - A selected strategy package would not fit all situations. Many variables affect the success of any particular approach in any particular situation.
  - The choice of a strategy package is guided by the key criteria of a particular change situation. The key criteria to be considered are the time available to effect the change, the extensiveness of the proposed change, the characteristics of both the change agent and target, and the resources available to implement change. These criteria are further described in subsection 2.4.5.1.
  - The strategy package includes the design of a series of strategies, the order of their conduct, and the tactics employed to carry each out. Several change strategies may be applied simultaneously to meet several but different objectives.

- The managed organizational change process implies a serial logic. The first step, identifying the destabilizing forces, must precede the second step, choosing the objects of change which precedes the third step, selecting the appropriate methods of change which in its turn precedes the fourth step, the design of an effective strategy package for implementing the strategy with the correct tactics.

- The result of the managed organizational change process is again a

changed organization. However, in this instance the process is not random but rather a purposeful response to the destabilizing forces affecting the status quo of the organization.

Proposition 61:
With regard to this research, it is suggested that the change that would be implicated if formalized project management were to be implemented in public sector work departments be effected by means of a managed organizational change process.

2.4.3 Sources of change

Connor and Lake (1988: 17) suggest that from a broad perspective, organizational changes have their source from either inside or outside the organization. The primary impetus for change or the factors which provide the greatest stimulus for change are thus either internal or external to the organization. Connor and Lake (1988: 18-21) identify the following external sources of change:

- **Social**. The changes are in the beliefs, values, attitudes, opinions and life styles of society as a whole. While social changes in attitudes may bring about new requirements for products or services, other changes may bring about more profound and unprogrammed changes, such as environmentalism and equality for minorities.

- **Political/legal**. Changes in the broad political ideology or narrow party political policies of the government in power may be significant sources of change. Relaxation of laws regulating industries, general deregulation and privatization also act as sources of external change.

- **Economic**. Conditions, such as growth or recession in the international or national economies, influence managerial outlooks and actions with regard to organizational expansion or contraction.

- **Technological**. General technological developments, such as computers, affect all organizations while other developments may be limited to a particular organization's own industry.

Connor and Lake (1988: 21-23) identify the following internal sources of change:

- Professional and occupational associations. People who relate to members of their professions or occupations outside their organizations through membership, subscription to journals, attendance at conventions or lectures, continually learn of new developments in their specialities which they may bring back to their own organization.

- Organizational goals. The adoption of new organizational goals may be the impetus for numerous structural and personnel changes.

- Organizational resources. An excess or a shortage of resources may stimulate the search for new ideas or ways to meet the objectives of the organization. Excess resources may, for example, be used for extra services for employees, such as the provision of supervisory or managerial training.

Proposition 62:
With regard to this research, it is suggested that the forces which would provide the greatest stimulus for change in public sector work departments are external factors beyond their control, such as political events, social changes and economic conditions.

Connor and Lake (1988: 23-25) further consider the general orientation of the organization to change as an important aspect for the beginning of change. Some organizations are innovative and appear receptive to change thereby frequently initiating and generally embracing changes. Conversely, others resist and avoid changes. They change infrequently and reluctantly adapt to the changes around it.

Proposition 63:
With regard to this research, it is suggested that the general orientation held by employess of public sector work departments (who are typically regarded as bureaucratic organizations) would reflect resistance to change and innovation.

2.4.4 Objects and methods of change

Connor and Lake (1988: 27-28) argue that to manage a change event successfully regardless of how spontaneous or planned it may be, the basic elements of change need to be understood. The basic elements of change which will be described are the objects of change (or what is changed) and the methods of change (or how the change is effected). These what and how elements illustrated in figure 2.4.2 form a basic descriptive system for understanding organizational change.

Figure 2.4.2: Classification of organizational change

METHODS OF CHANGE	OBJECTS OF CHANGE			
	INDIVIDUAL TASK BEHAVIOUR	ORGANIZATIONAL PROCESSES	STRATEGIC DIRECTION	ORGANIZATIONAL CULTURE
STRUCTURAL				
TECHNOLOGICAL		**STRATEGIES**		
MANAGERIAL				
HUMAN				

Source: Connor, P.E. & Lake, L.K. 1988. *Managing organizational change*. Prager Publishers. Figure 3.1. p. 29.

2.4.4.1 Objects of change

Connor and Lake (1988: 28-51) identify four major areas where change may occur, namely:

- **Individual task behaviour**. Change events will be focused on task characteristics, such as skill variety, task identity, task significance, degree of autonomy, feedback provided, and opportunity for employee interaction.

- **Organizational processes**. Change events will be focused on the control, reward, appraisal and decision processes within the organization.

- **Strategic direction**. Change is implemented in the overall direction that an organization follows. Changing the strategic direction or domain of the organization may be difficult to manage and could mean changing the structure of the organization, its management or even collective self-identity.

- **Organizational culture**. In general, this consists of the shared values, beliefs and expectations which create norms that shape individual and group behaviour in the organization.

Proposition 64:
With regard to this research, it is suggested that, should formalized project management be implemented in public sector work departments, changes (in order of highest priority) would be needed in (1) organizational processes (2) individual task behaviour (3) organizational culture and (4) strategic direction.

2.4.4.2 Methods of change

Connor and Lake (1988: 54-88) identify four distinct approaches or methods of change:

- **Technological method**. This method concerns the production processes of the organization. It is aimed at improving either the quality or quantity of output. The change typically involves new equipment or techniques and may be accomplished through job diagnosis, job engineering, job rotation, job enlargement, job enrichment or changing job relationships.

- **Structural method**. This method concerns the modification of certain roles or relationships. The change pertains to the division and coordination of the labour in the organization. Effecting change involves altering the structural dimensions of complexity, formalization, centralization, and coordination.

- **Managerial method**. This method effects change through adminis-

trative actions, such as the reward system or through joint cooperation between employees and management.

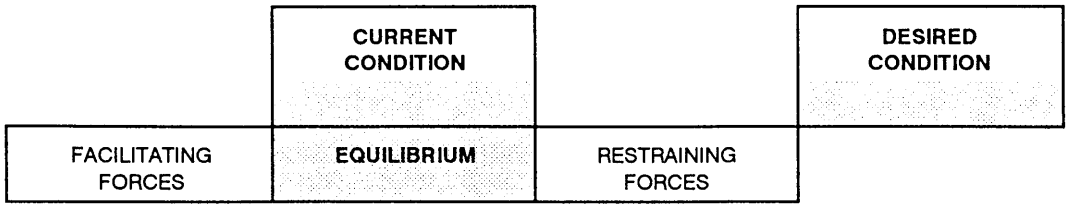
- **Human-oriented methods**. This method effects change through the people who work in the organization rather than through impersonal ways, such as changes in procedures or structural relationships. Principal methods by which people are the major instruments of change include participation in education/training programmes and organization-development interventions.

Proposition 65:
With regard to this research, it is suggested that, should formalized project management be implemented in public sector work departments, the methods of change (in order of most appropriate and greatest chance of success) would be (1) structural method (2) human-oriented method (3) managerial method and (4) technological method.

2.4.5 Strategies for change

Connor and Lake (1988: 90-91) propose a force-field view of change management. The concept, illustrated in figure 2.4.3, indicates that a change situation involves moving from a current condition to a desired condition. The current condition is held in equilibrium by two sets of forces: those that facilitate movement to a new situation and those that restrain or hinder such movement. These forces need to be identified and understood for management to develop a general plan of action or a strategy for managing the change.

Figure 2.4.3: Force-field view of change management



Source: Adapted from Connor, P.E. & Lake, L.K. 1988. *Managing organizational change*. Prager Publishers. Figure 6.1. p. 91.

2.4.5.1 Criteria for the selection of change strategies

Connor and Lake (1988: 91-93) emphasize the need to select an appropriate strategy for managing change. The key aspects to consider in selection are:

- **Time available**. The amount of time available to make the change is a necessary consideration because some strategies need more time to implement than others.

- **Extent of change**. The extensiveness of the advocated change in terms of the scope (number of individuals and organizational units that will be affected by the change) and depth (number of behaviours that need to change) of the change.

- **Favourableness of the change target**. This aspect considers the people who are the target of the change. Target favourableness is generally reflected in the target awareness, the belief in the need for change, and the degree of commitment to the proposed change. In addition, a target group is considered favourable if the members generally have a high degree of competence in dealing with change and are knowledgeable about the situation and their own abilities.

- **Characteristics of the change agent**. This aspect considers both the organizational and personal characteristics of the person (referred to as the change agent) who has the operational responsibility to conduct a particular change event.

Proposition 66:
With regard to this research, it is suggested that, should formalized project management be implemented in public sector work departments, the outcome in relation to the key criteria for the selection of a change strategy would be (1) time required - long (2) extensiveness of change - substantial (3) favourableness of change target - unfavourable and (4) suitability of change agent - a designated, outside consultant.

2.4.5.2 Change strategies

Connor and Lake (1988: 93-105) argue that a distinction must be made between change strategies and change tactics.

Strategies are the general design or plan of action while tactics are the concrete and specific actions that flow from the strategy. Four types of strategies are generally available for effecting change, namely:

- **Facilitative strategies**. These assist the change target in making the change or use the abilities or resources of the target to conduct the change. They are based on the assumption that the target has some willingness and ability to participate in the change process. These strategies make it easier for the change target to accomplish a given change programme by providing critical resources, for example.

- **Informational strategies**. These are frequently used to educate people to overcome their resistance to the proposed change. Such education works best when it anticipates and defuses particular points of resistance. When using informational strategies, those responsible for managing a change effort offer knowledge, facts and opinions so that change targets can make rational decisions and take the indicated action.

- **Attitudinal strategies**. These are based on the premise that a change in attitude will either produce a change in behaviour or help maintain a behaviour that already has been changed. Attitudes are changed in a three-stage process involving unfreezing, moving and refreezing. The intent of these strategies is to change attitudes and in so doing also behaviour.

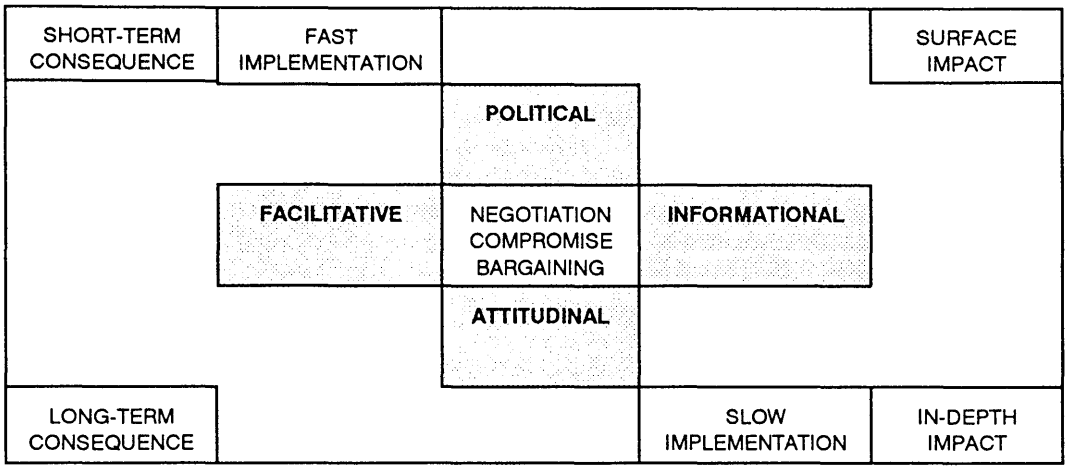
- **Political strategies**. These depend on giving, withholding, competing, or bargaining for scarce resources to achieve the change objectives. They vary from unilateral power coercion to complex manoeuvring.

Selecting strategies for managing a change process thus requires that a number of considerations be taken into account. Each strategy differs with regard to the implication on different dimensions. These are illustrated in figure 2.4.4 and in general refer to:

- **Speed of implementation**. Political (especially the coercive type) and facilitative strategies can be implemented quickly. Informational and attitudinal strategies involve a slower rate of implementation.

- **Short-term versus long-term duration of effects**. Political strategies (coercive type) produce impacts that last over a short period while attitudinal strategies have longer lasting effects.

Figure 2.4.4: Change strategies and implications



Source: Adapted from Connor, P.E. & Lake, L.K. 1988. *Managing organizational change*. Prager Publishers. Figure 6.2. p. 104.

- **Depth of impact**. Attitudinal strategies are aimed at the attitude level to achieve commitment rather than simply compliance gained through coercive political strategies.

- **Manner of influence**. Facilitative and informational strategies attempt to help the target group to accept or absorb the proposed change. Political and attitudinal strategies are used to persuade, force or even manipulate the target group to adopt the change.

- **Combined strategies**. These are the most complex forms of strategic approaches to change management. They involve a combined, comprehensive programme of negotiation-compromise-bargaining which includes a range of strategy approaches, such as facilitation, information sharing, political manoeuvring and attitudinal changes.

Proposition 67:
With regard to this research, it is suggested that, should formalized project management be implemented in public sector work departments, the most appropriate combination of strategies would be (1) informational (2) attitudinal (3) political and (4) facilitative.

2.4.6 Participation in the change process

Connor and Lake (1988: 107) note that, apart from the objects, methods and strategies of organizational change, a further element of the change process is the people who are involved.

The first group of people involved with change are the change managers. They design, oversee and generally direct change as part of their regular duties. Change managers anticipate the elements of change, choose and guide those who will participate in the change, select the strategy packages, and assess the results.

The second group of people involved in change are the change agents who create and conduct change. They play a variety of roles in the management of change, such as that of catalyst, solution giver, process helper and resource linker.

The third group of people to consider are those people who work in the organization and must implement the changes. They may be the primary objects of the organizational change or may have to change as a result of other changes made in the organization.

Proposition 68:
With regard to this research, it is suggested that, should formalized project management be implemented in public sector work departments, the role of change manager would be best suited for top-level management, the role of change agent for middle management while the change targets would include the functional managers and other personnel.

2.4.6.1 Change agents

Connor and Lake (1988: 107-108) see change agents as the people who operate to alter the status quo in an organization. Their intention is to cause parts of an organization to operate differently from the way in which it has operated in the past.

The people who assume the change agent role should be determined by the combination of desired personal and organizational characteristics. Connor and Lake (1988: 109-115) argue that these characteristics will influence the effectiveness of the change agent.

2.4.6.2 Change targets

Connor and Lake (1988: 117) see change targets as the people who are expected to change when the organization changes. In some situations people may be required to change not as a primary method of changing the whole organization, but rather as a result of other changes made in the organization. A major concern in managing change would thus be resistance to change.

Connor and Lake (1988: 117-118) regard resistance to change as any

attempt to maintain the status quo when pressure is applied to bring about change. Acts of resistance may slow or even halt the organization's transition from its current state to some desired future state. Change agents must recognize the inevitable presence of resistance to change and develop strategies for dealing with it.

Connor and Lake (1988: 119-127) categorize the causes or sources of resistance to change into three groups:

- **Barriers to understanding**. The resistance may be traced to a misunderstanding of the proposed change. The change targets resist the change because they do not understand the need for the change, the details or substance, or the consequences of the change. The lack of knowledge or understanding of a change may be (1) intellectual (information not communicated) (2) cultural (change explained from a unfamiliar point of view) or (3) caused by inconsistent behaviour from executives, managers or the change agent (one course is advocated but another course, which is better suited, is followed).

- **Barriers to acceptance**. This type of resistance follows when the change targets cannot or will not accept the change. Acceptance requires believing in the necessity for the change and a willingness to follow through in accomplishing it. The barriers to acceptance are caused by (1) a threat to employees' security over their organizational lives, which results in uneasiness and anxiety about the new roles and conditions required (2) the threat to their self-confidence or (3) anxiety about the loss of organizational power.

- **Barriers to acting**. This type of resistance occurs at the stage when the change should be implemented. It stems from either the change targets themselves or from other people within or outside the

organization. The barriers to acting may result from (1) the lack of skills or abilities which will be required in the new organization (2) the lack of or inadequate resources to conduct the range of activities needed for the change (3) the presence of existing prohibitive or contractual arrangements with employee unions or associations that require specific methods which may not be revised or (4) organizations may simply, through habit or convention, support the status quo with existing managerial procedures, job descriptions and cultures.

Proposition 69:
With regard to this research, it is suggested that, should formalized project management be implemented in public sector work departments, the sources of resistance (in order of greatest importance) would be due to (1) barriers of acceptance (2) barriers to understanding and (3) barriers to acting.

2.4.7 Change policies

Connor and Lake (1988: 129) define a change policy as the set of assumptions, diagnostic conclusions and guidelines that serve as the basis for managing specific changes. It should be noted that the basic considerations with regard to the sources, objects, methods and strategies for change which were previously discussed do not, in themselves, detail the full extent of managing change. Considering the practical elements of change in conditions other than the idealized future state of the organization leads to the development of a change policy. The practical issues involved with a change policy are change versus stability, resource availability and allocation, and transition management.

2.4.7.1 Change versus stability

Connor and Lake (1988: 130-131) argue that not all elements of the organization will be altered at once in a revolutionary style. Not only is it unlikely that all aspects will require change at once, but further such extreme degrees of change could be undesirable. The new organization would probably require some blend of change and stability. The goal would thus be to make only the number of changes that is suitable in each particular case.

Connor and Lake (1988: 131-135) suggest a framework for change managers to decide whether all or only some of the indicated changes should be carried out in aggregate and immediately or rather phased in over time individually. The decision is aided by examining:

- **Organizational culture**. While some organizations have no particular positive or negative norms for innovation and change or little experience with them, others, however, do have cultural characteristics which may indicate the prospect of an organization accepting and implementing many changes at once.

- **People associated with the organization**. Change policies are further developed by assessing the general nature or characteristics of the people associated with the organization, such as the employees (number of changes likely to be accepted versus number required according to strategies and tactics) and the clients (willingness to accept changes and degree of captivity in market).

- **Details of the proposed change**. The strength and seriousness of the forces necessitating change should be considered. Furthermore, the degree to which changes can be modularized and the effect of

instituting only some of the modules at a time should be determined.

- **Interactions among changes**. Interactions among the various changes could occur and these should be anticipated.

Proposition 70:
With regard to this research, it is suggested that, should formalized project management be implemented in public sector work departments, a change policy should be followed whereby some of the indicated changes are gradually phased in over time rather than all changes in aggregate manner immediately.

2.4.7.2 Resource availability and allocation

Connor and Lake (1988: 135-138) note that to conduct organizational change, expenditure of people, time and monetary resources are required. With regard to resource requirements, the activities involved in managing change can broadly be divided into three phases:

- **Diagnostic resource requirements**. People chosen to investigate problems or conduct diagnosis may be determined more by resource availability than their suitability to the task.

- **Implementation resource requirements**. After diagnosis, the changes which are actually implemented are determined to a large degree by the resources that can be applied.

- **Institutionalization resource requirements**. After changes have been introduced, resources are needed to institutionalize these changes. Costs involved are those associated with discarding the old and

replacing it with the new and the costs of the activities required to prevent the organization from reverting to its previous position.

- **Resource allocation decisions**. In each of the above phases resources are required. Organizations do not have unlimited resources. Applying resources in one area might mean that they cannot be applied elsewhere. Resource availability and allocation become a practical consideration tempering the pursuit of the ideal state.

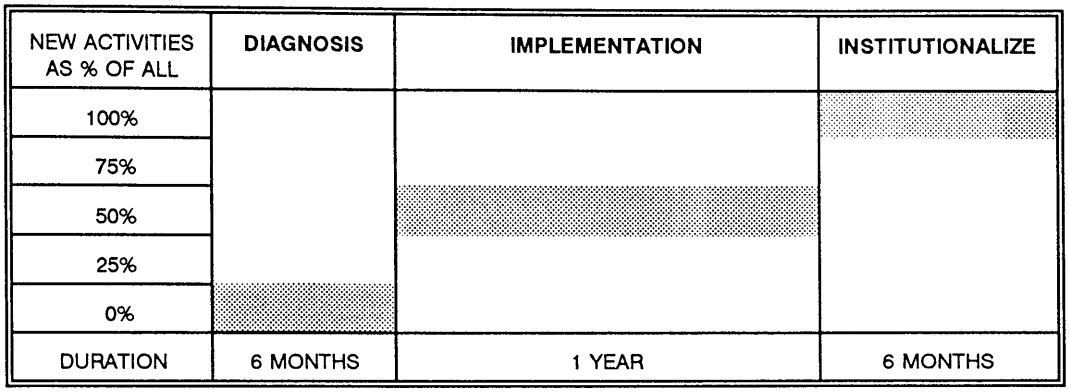
Proposition 71:
With regard to this research, it is suggested that, should formalized project management be implemented in public sector work departments, limited resources would have the greatest negative impact on (1) institutionalization (2) implementation and (3) diagnosis of problems.

2.4.7.3 Transitional management

Connor and Lake (1988: 138-142) view transitional management as the acts to propel the organization forward along the path of change while still conducting its business or tasks. Transition refers to the movement of the organization from its current "troubled" state to the new state. Transitional management thus involves not just managing the current or transition organization, but also the new organization.

Managing the transition is the final step in developing a change policy. The use of a transition profile as illustrated in figure 2.4.5 is a useful tool for understanding and managing the transition.

Figure 2.4.5: A transition profile



Source: Adapted from Connor, P.E. & Lake, L.K. 1988. *Managing organizational change*. Prager Publishers. Figure 8.1. p. 140.

The figure depicts the progression of the organizational change through the three major change stages of diagnosis, implementation and institutionalization. The measure of progress of the change is the upward movement of the line while points along this line represent the new or changed activities as a percentage of all the activities carried out by the organization. A transition profile is useful because it may be used as a planning device (indicating when all of the individual change elements must be implemented and the established final goal of the change effort) and a control device (to monitor and assess the success of the whole change effort).

Transition management when combined with a detailed diagnosis and consideration of the desired blend of stability as well as the resource availability and allocation offers change managers a means for managing small and extended organizational change.

2.4.8 Institutionalizing changes or strategies

Pearce and Robinson (1985: 321) suggest that the annual objectives,

functional strategies and specific policies provide important means of communicating what must be done to implement the overall strategy. These instruments translate the long-term intentions into short-term guides of action or operationalize the strategy. If the strategy is to be effectively implemented, it should also be institutionalized, that is, permeate the normal day-to-day life of the organization. Pearce and Robinson (1985: 321) then further identify three organizational elements which provide the fundamental, long-term means of institutionalizing the strategy in the organization. The elements are structural considerations, organizational leadership and culture.

Proposition 72:
With regard to this research, it is suggested that, should formalized project management be implemented in public sector work departments, the best way (in order of greatest impact) to ensure that it remains effectively and efficiently applied would be (1) organizational culture (2) organizational leadership and (3) structural adjustments.

2.4.8.1 Structural considerations

Pearce and Robinson (1985: 321-322) note that an organization is necessary if strategic purpose is to be accomplished. The organizational structure, which reflects the formal reporting relationships and responsibilities in the organization, is a major priority in implementing a carefully formulated strategy. Should the activities, responsibilities, and interrelationships not be organized in a manner consistent with the strategy chosen, the structure is left to evolve on its own. Strategy and structure have to be coordinated to avoid the probable results of inefficiencies, misdirection and fragmented efforts.

The organizational structure is not the only means of organizing to implement the strategy. Reward systems, planning procedures, and information systems are other examples that may be employed.

All forms of organizational structure are not equally effective in implementing a strategy. Often the need for immediate and radical changes in structure is not immediately perceived. Once the need is perceived, lagging performance may be necessary before politically sensitive structures are changed or organizational power redistributed.

Proposition 73:
With regard to this research, it is suggested that, should formalized project management be implemented in public sector work departments, changes in the organizational structure would be a prerequisite to implement such a strategy.

2.4.8.2 Organizational leadership

Pearce and Robinson (1985: 333-336) argue that while the organizational structure provides the overall framework for strategy implementation, by itself it is not sufficient to ensure successful execution. Within the structure, individuals, groups and units are the mechanisms of organizational action. The effectiveness of their actions is a major determinant of successful implementation. Within this context, two basic factors either encourage or discourage effective action, namely leadership and organizational culture.

Leadership is an essential element of effective strategy implementation. Two important leadership issues are:

- **The role of the chief executive officer** (CEO or executive head of the

organization). The CEO is seen as the catalyst in strategic management. This individual is most closely identified with and ultimately accountable for the strategy success. The role is both symbolic (the CEO is seen as the symbol of the new strategy) and substantive (the CEO represents an important source of clarification, guidance and adjustment during implementation).

- **Assignment of key managers**. Confidence in the individuals occupying pivotal managerial positions is directly and positively correlated with top-level management expectations that a strategy will be successfully executed.

Pearce and Robinson (1985: 337-341) suggest that two aspects of the strategic situation influence the managerial assignment decision: first, the changes required to implement the new strategy and second, the effectiveness of the organizational performance in the past. Four main positions identified are illustrated in figure 2.4.6.

- **The turnover situation**. The past performance was ineffective and to implement the new strategy would require major changes in the organization. In this situation, the advantages of bringing in outside managers should be maximized.

- **The selective blend**. The past performance was effective but to implement the new strategy, major changes in the organization are required. Changing markets or other external environmental factors necessitate a change in the strategic posture. The emphasis should be a selective blend of using current managerial talent and outsiders to provide needed knowledge and skills that are not available internally.

Figure 2.4.6: Managerial assignment situations

		"SELECTIVE BLEND"	"TURNOVER"
CHANGES REQUIRED TO IMPLEMENT	MANY	Use current managers via promotions or transfer where skills match new roles / otherwise seek required skills and experience via outsiders	The use of outsiders is a priority to provide new skills, motivation and enthusiasm
		"STABILITY"	"REORIENTATION"
	FEW	Use current managers as the major emphasis in order to reward, retain and develop managerial talent	Outsiders should replace weaknesses but use current managers as a priority where possible via promotion, transfer or role clarification
		EFFECTIVE	INEFFECTIVE
		PAST ORGANIZATIONAL PERFORMANCE	

Source: Adapted from Pearce, J.A. & Robinson, R.B. 1985. *Strategic management: strategy formulation and implementation*. 2nd edition. Homewood, Illinois: Richard D Irwin, Inc. Figure 11-7. p. 339.

- **The stability situation**. The past performance was again effective and to implement the new strategy would require minor or few changes in the organization. In this situation the advantages associated with current or existing managers could be maximized.

- **The reorientation situation**. Past performance was ineffective and to implement the new strategy would require minor changes in the organization. A key issue in this position is whether the ineffectiveness is linked to inadequate skills or capabilities of current management. Should this be the case, outsiders could play a key role in reorientation or refocusing organizational efforts toward an otherwise sound strategy.

Proposition 74:
With regard to this research, it is suggested that public sector work departments would perceive their past performance as effective and would recognize that many major changes will be needed to implement formalized project management. The departments would favour a selective blend position (Pearce & Robinson, 1985) whereby the current managerial talent is maintained but new managerial talent appointed to provide the needed knowledge and skills not available internally.

2.4.8.3 Organizational culture

Pearce and Robinson, (1985: 341-346) view the organizational culture as similar to the personality of an individual, that is, an intangible yet ever-present theme that provides meaning, direction, and the basis for action. Culture is defined as the shared values, beliefs, expectations and norms learned by becoming a part of and working in an organization over time. These shared values and beliefs within an organization set a pattern for the opinions of employees and managers, how they approach problems and conduct activities and actions within the organization.

Organizational culture is of critical importance in the institutionalization of strategy because it serves as a bridge between what is formally decreed and what actually occurs in the organization. When the culture is consistent with the strategy, it may become a powerful driving force in implementation.

Managing the organizational culture by understanding the concept and improving the strategy-culture consistency necessitates that the factors which shape the culture be identified. Pearce and Robinson (1985:

344-346) refer to the McKinsey 7-S framework whereby the product of the following broad factors of strategy, structure, systems, styles, staffing, shared values and skills, all shape the culture of the organization. These factors are also the central elements which an organization must use in implementing a strategy.

Pearce and Robinson (1985: 346-354) argue that managing the strategy/ culture relationship requires sensitivity to the interaction between the changes necessary to implement the new strategy and the potential compatibility between those changes and the existing culture of the organization. They identify four basic situations illustrated in figure 2.4.7.

Figure 2.4.7: Managing the strategy/culture relationship

		CELL 1	CELL 4
CHANGES REQUIRED TO IMPLEMENT	MANY	Link changes to basic mission and fundamental organizational norms	Reformulate strategy or prepare for careful long-term, difficult change
		CELL 2	CELL 3
	FEW	Synergistic - focus on reinforcing culture	Manage around culture
		HIGH	LOW
		POTENTIAL COMPATIBILITY WITH EXISTING CULTURE	

Source: Adapted from Pearce, J.A. & Robinson, R.B. 1985. *Strategic management: strategy formulation and implementation*. 2nd edition. Homewood, Illinois: Richard D Irwin, Inc. Figure 11-8. p. 346.

- **The link to mission situation**. In cell 1, the organization faces implementing a new strategy which requires several changes in structure, systems, managerial assignments, operating procedures or other fundamental aspects in the organization. However, most of the changes are potentially compatible with the existing organizational culture.

- **The maximize synergy situation**. In cell 2, the organization faces a situation where a only few organizational changes are needed to implement the strategy and these changes are highly compatible with the current culture.

- **The manage around culture position**. In cell 3, the organization faces a situation where a few organizational changes must be made but at the same time these changes are potentially inconsistent with the current organizational culture. Managing around the culture is important when an organization faces a changing factor (such as structure) which is inextricably linked to the current organizational culture.

- **The reformulate position**. In cell 4, the organization faces a situation where numerous organizational changes are needed to implement the strategy and furthermore, the number and nature of these changes are incompatible with the current and entrenched values and norms. The organization should again examine the necessity to change so many of the fundamental organizational factors and evaluate whether the changes can be made with any real expectation of acceptance and success. If not, the organization should seriously reconsider and reformulate its strategy. Reformulation may not be in the long-term interests of the organization, however, and may therefore necessitate changes being made in the fundamental culture of the organization.

Proposition 75:
With regard to this research, it is suggested that public sector work departments would recognize that numerous organizational changes would be needed to implement formalized project management and would further perceive the changes as incompatible with the current organizational culture. The departments would be in the reformulate position (Pearce & Robinson, 1985) and prefer to alter a strategy for formalized project management rather than change their organizational culture.

2.4.9 General change management model

Connor and Lake (1988: 143-144) present their general change management model which shows the relationships among the various processes that are prescribed as the means for properly planning and conducting a complex organizational change. The model, which is illustrated in figure 2.4.8, incorporates a process perspective for formulating and implementing a strategy as suggested by Schellenberg (1983) (see table 2.2.1). It comprises four major segments which are described in subsections 2.4.9.1 to 2.4.9.4 and then applied to the field of research in subsection 2.4.9.5.

2.4.9.1 Segment I: Initiating processes

Connor and Lake (1988: 145-155) identify five steps in the first major segment which may collectively be described as the initiating process. This segment describes the process of change from the acknowledgment of the problems affecting the organization to the formulation of an ideal solution. The steps are:

Figure 2.4.8: General change management model

SEGMENT I: INITIATING PROCESS	STEP 1:	ACKNOWLEDGE DESTABILIZING FORCES
	STEP 2:	ANALYZE AGAINST ACCEPTED STANDARDS
	STEP 3:	FORMULATE PROBLEM STATEMENTS
	STEP 4:	SUGGEST SOLUTIONS
	STEP 5:	DEVELOP IDEAL SOLUTION (change: objects, methods, agents and targets)
SEGMENT II: SUITABILITY OF SOLUTION	STEP 6:	DESCRIBE CURRENT ORGANIZATIONAL STATE
	STEP 7:	DESCRIBE FUTURE ORGANIZATIONAL STATE
	STEP 8:	DESCRIBE DIFFERENCES BETWEEN CURRENT AND FUTURE ORGANIZATIONAL STATES
	STEP 9:	DESCRIBE RESTRAINING AND FACILITATING FACTORS
	STEP 10:	REVISE VISION OF FUTURE STATE
SEGMENT III: FORMULATE CHANGE	STEP 11:	CONSTRUCT TRANSITION MANAGEMENT PROFILE
	STEP 12:	DEVELOP STRATEGIES AND TACTICS
SEGMENT IV: IMPLEMENT CHANGE	STEP 13:	IMPLEMENT STRATEGIES AND TACTICS
	STEP 14:	INSTITUTIONALIZE CHANGES
	STEP 15:	EVALUATE THE CHANGE(S)

Source: Adapted from Connor, P.E. & Lake, L.K. 1988. *Managing organizational change*. Prager Publishers. Figure 9.1. p. 144.

- **Step 1: Acknowledge the destabilizing forces**. Organizational change begins with the recognition that change is required. It should be acknowledged that the organization is no longer stable and that forces are operating to destabilize it. Elements of the organization may need to be changed to again achieve stability.

- **Step 2: Analyze against accepted standards**. The current conditions in the organization should be compared to standards generally used to judge the adequacy of organizations in general.

- **Step 3: Formulate a problem statement**. At this stage the consequences of the problems should be known, but the exact nature of the problems still needs to be determined. A distinction must be drawn between the problem itself and the symptoms of the problem. It is essential to move beyond the list of symptoms in order to discover the true underlying problems. This requires diligent questioning and tracking.

- **Step 4: Suggest solutions**. Once problems are clearly identified and defined, solutions may be generated. The solutions may appear spontaneously or may be derived only after considerable analysis. The change that is finally undertaken may incorporate the implementation of several of these proposed solutions.

- **Step 5: Develop the ideal solution**. After considering the various of solutions that could be implemented, some must be selected from which a complete picture of the ideal organizational change can then be drawn. The change objects, methods, agents, and targets must be named. Furthermore, the goal of the change that is linked to the problem statement should be included. It should be noted that as the ideal solution is being developed, it may be necessary to revert back to some of the previous steps, such as redefinition of the problem or application of additional diagnostic techniques in order to clarify then still uncertain aspects.

2.4.9.2 Segment II: Suitability of the solution

Connor and Lake (1988: 155-159) identify five steps in the second major segment which determines whether the ideal solution can be implemented but, if necessary, also prepares a revised set of solutions. The steps are:

- **Step 6: Describe the current organizational state**. Describing the current organizational state serves as the control measure against which the future state is viewed.

- **Step 7: Describe the future organizational state**. Having identified the ideal solution and detailed the objects, methods, targets, agents, and the goal of change, a picture of the organization with the changes in place could be drawn. The effects of the intended change on the normal operations of the organization must be envisioned. While it may be difficult to picture the myriad results of seemingly simple changes, this serves as a basis for determining how extensively the change will affect the organization and its employees.

- **Step 8: Describe the differences between the current and future states**. Discovering the real differences between how the organization currently operates and how it is imagined it will operate in the future, provides a change manager with an idea of where certain strategies and tactics may be employed to ensure that change is successfully accomplished. The itemized differences enable the change manager to see the true scope of the change. This also helps to determine which resources would be needed and where problems may arise.

- **Step 9: Describe the restraining and facilitating factors**. The factors that restrain the organization from changing and the factors that facilitate such a change should be specified and their importance

assessed. The description of these factors aid the change manager in deriving strategies and tactics which could either remove or lessen the restraining factors but also could create or augment the facilitating factors.

- **Step 10: Revise the vision of the future organizational state**. The facilitating and restraining factors may change the picture of the ideal state. The revised vision reflects the existing situation and that which is practical and can be realised. Should the ideal change result in many differences that cannot be accomplished, then a revised vision might entail less aggressive goals and approaches. Activities at this point offer the opportunity to factor all that has been learned into the original determination of the proposed change effort.

2.4.9.3 Segment III: Formulating the change

Connor and Lake (1988: 159-165) identify two steps in the third major segment where the actual plans for conducting the change are formulated. The steps are:

- **Step 11: Construct the transition management profile**. This profile represents the activities undertaken both to progress towards the new desired future state and those which provide for the management requirements of the organization during the transition. The profile should take both the facilitating and restraining factors into account. Should the profile disclose conflicts, inadequate resources, or excessive restraining factors, it may be necessary to alter the planned change or its scheduled implementation drastically.

- **Step 12: Develop strategies and tactics for the change**. Strategies and tactics must be developed to accomplish the primary change and

also the changes that will result or must occur as a result of the primary change. Strategies will be chosen to accomplish the change, to exploit the facilitating factors in the current state and to diminish the force of the restraining factors when present. Figure 2.4.9 illustrates a process for choosing strategies.

Figure 2.4.9: Selection of change strategies

TIME change quickly? (YES / NO)	EXTENSIVE extensive change? (YES / NO)	TARGET favourably disposed? (YES / NO)	FEASIBLE STRATEGIES	AGENT REQUIREMENTS
		YES **(F)**	(1) Facilitative	Location and access to essential resources necessary
	YES **(F/P)**	NO **(P)**	(2) Political	Power, authority to command action and influence necessary
YES **(F/P)**	NO **(F/P)**	YES **(F/P)**	(3) Facilitative Political	As (1) and (2) above
		NO **(P)**	(4) Political	As (2) above
		YES **(F)**	(5) Facilitative	As (1) above
	YES **(F/I/A/P)**	NO **(I/A/P)**	(6) Informational Attitudinal Political	Knowledge, personal ability to inform and open channels needed
NO **(F/I/A/P)**	NO **(F/I/P)**	YES **(F)**	(7) Facilitative	As (1) above
		NO **(I/P)**	(8) Informational Political	As (6) above

Source: Adapted from Connor, P.E. & Lake, L.K. 1988. *Managing organizational change*. Prager Publishers. Figure 9.3. p. 163.

The process is based on the key criteria of a change situation (time, extent of change, favourableness of the change target and agent). The

ordering of the aspects in the decision-tree format allows for the demonstration of the cumulative effect on the choice of the different strategies.

2.4.9.4 Segment IV: Implementing the change

Connor and Lake (1988: 165-171) finally identify three steps in the fourth major segment where the change managers and agents implement and evaluate the changes. The last three steps are:

- **Step 13: Implement strategies and tactics**. The characteristics of the change itself and the facilitating and restraining factors have led the change manager and agent to a particular course of implementation. The implementation of the strategies will follow the developed transition management profile and therefore some of the activities may already have been initiated. Despite the extensive planning done up to this point, it may be possible that not all eventualities would have been foreseen. During implementation, new facilitating and restraining factors may have appeared which would necessitate additional activities. More or fewer resources may be needed and may result in either accelerating or even abandoning the change effort entirely.

- **Step 14: Institutionalize changes**. The change must be institutionalized. The change would be expected to persist if the destabilizing factors were correctly diagnosed, the solution intelligently developed, the targets and agents chosen wisely and the facilitating and restraining factors noted and dealt with by well-designed strategies and tactics.

- **Step 15: Evaluate the change**. The value in assessing an organiza-

tional change is to learn from the mistakes and successes and to apply this knowledge in future efforts. While the change is likely to be evaluated individually and informally, the greatest impact can be gained through a formal evaluation whereby managers and others can recognize which of their actions contributed positively or negatively to the outcome.

Both the results and the process of actually conducting the change should be evaluated. The results can be evaluated against the original change goals and the described future state, and in terms of how well established or institutionalized the change has become. The process can be evaluated on how rapidly the change was accomplished, the costs to individuals and the organization, and the number of unanticipated actions and occurrences it generated.

2.4.9.5 Application of the Connor and Lake general change management model to the research

With regard to this research and the application of the Connor and Lake (1988) general change management model, it is suggested that the following will apply:

- **Step 1: Acknowledgment of the destabilizing forces**. Public sector work departments will indicate that destabilizing or disrupting forces are present, some organizational adjustments are needed to deal with these forces, the major source of the forces is external, and these departments generally will resist change.

- **Step 2: Analysis against standards**. Public sector work departments will perceive that their past and current performance compares favourably with a so-called "ideal model" of a department in similar

circumstances.

- **Step 3: Problem formulation**. From a macroperspective, the principal problem involves the expected increase in the demand for collective services and the provision of such services and accompanying physical facilities or building accommodation with limited resources.

  From a microperspective, the problem involves the optimal provision of building accommodation by the public sector work departments.

  The problem on which this research is focused is to determine how formalized project management could effectively and efficiently be implemented in public sector work departments responsible for the construction activities to provide such building accommodation.

- **Step 4: Solutions suggested**. Many solutions could be suggested to the problem central to this research. However, this research assumes that the alternatives to be examined are limited to the formalized application of project management in public sector work departments.

- **Step 5: Ideal solution developed**. While the ideal solution to the problem suggested is the formalized implementation of project management in the public sector work departments responsible for the construction activities to provide building accommodation, empirical research data is needed to determine the objects, methods, agents and targets of change to implement such a solution.

- **Step 6: Current organizational state described**. Public sector work departments will indicate that formalized project management is either (1) applied (2) informally applied or (3) not applied at all.

- **Step 7: Future organizational state described**. It is envisioned that public sector work departments will accept the proposed solution and implement formalized project management.

- **Step 8: Describe differences between the current and future states**. The research will attempt to identify and describe the changes needed to implement formalized project management in public sector work departments.

- **Step 9: Describe the restraining and facilitating factors**. Through gathering empirical data, the research will identify and assess the importance of both restraining and facilitating factors in the accomplishment of the objective to implement formalized project management in public sector work departments.

- **Step 10: Revise the vision of the future organizational state**. Having identified and assessed the factors which restrain and facilitate a transition to formalized project management in public sector work departments, practical considerations may necessitate a revision of the proposed future state.

- **Step 11: Construct a transition management profile**. Following the empirical data gathered, a transition management profile could be constructed detailing the activities needed to proceed to the proposed future organizational state.

- **Step 12: Develop strategies and tactics for the change**. Based on the empirical data obtained on the key criteria, a change strategy will be selected.

- **Step 13: Implement strategies and tactics**. The actual implementing

of the proposed strategy is beyond the scope of the research.

- **Step 14: Institutionalize changes**. Again, this step is beyond the scope of the research but empirical data will be gathered relating to the factors which may affect the institutionalization of the proposed strategy.

- **Step 15: Evaluate the change**. Since the actual implementing of the proposed strategy is beyond the scope of the research, it will not be possible to evaluate the actual success of the change by the final result and the process of change. Yet it is envisioned that it theoretically be assessed whether a strategy, derived from the results of respondents could contribute significantly to formalized project management being effectively and efficiently implemented in public sector work departments. The evaluation of the change is thus limited to this theoretical assessment.

2.4.10 Summary

Section 2.4 focused on the process-related issues of strategy formulation and implementation. The purpose was to describe the procedures and the different steps followed in formulating and implementing a strategy for formalized project management.

The section commenced with the presentation of a model for a managed organizational change process against which a "natural" or unmanaged change process was contrasted.

Following the serial logic of this model, the elements of the change process were then described. These include the sources, objects, methods and strategies for change. The two primary sources of change identified were

those originating within and outside the organization. Four main organizational properties which are the objects of change are individual task behaviours, organizational processes, strategic direction and the organizational culture. The methods by which change may be induced include the technological, structural, managerial and human-oriented methods. Change strategies identified include facilitative, informational, attitudinal and political strategies. These strategies are selected on the criteria of time available to effect the change, the extensiveness of the proposed change, the characteristics of both the change agent and targets, and the resources available to implement the change.

The people involved are a further important element in the process of change. These include the change manager, who designs, oversees and generally directs the change, the change agents, who create and conduct the change, and lastly, the change targets, who may be the primary objects of the organizational change or may have to change as result of other changes made in the organization.

Moving to more practical issues of change strategies, change policies reflect the timing, resource availability and allocation, and a programme of transitional management for implementing the actual change. Institutionalizing changes or strategies in an organization is done through the elements of structure, organizational leadership and culture.

Finally, the general change management model of Connor & Lake (1988) was presented in which the four major segments of management of organizational change were detailed: initiating, evaluating, formulating and implementing the change strategy. The fifteen steps indicated in the model were then applied to the field of research in order to demonstrate how the process of formulating and implementing a strategy for formalized project management could be carried out.

2.5 CHAPTER SUMMARY

As stated in section 1.3, the purpose of the research is to develop an implementation strategy for the application of formalized project management in public sector work departments responsible for the construction activities by which building accommodation is provided. The literature review was thus focused on three main subject areas: implementation strategies, project management and management of organizational change.

Section 2.2 examined the construct of an implementation strategy. Following the recommendation of Schellenberg (1983), strategy formulation and implementation were viewed from both a content and a process perspective. The content perspective focuses on what the strategy is (i.e. strategy formulation) and what the tools for implementation are (i.e. strategy implementation). The process perspective focuses on how a strategy should be formulated and implemented. This division provided the general analytical framework for the remainder of the literature review.

Section 2.3 reviewed the project management literature. The purpose was to obtain an understanding of the content of formalized project management. Project management focuses on the management of projects. In order to gain an understanding of this approach, it was then necessary to define project management and describe the main elements of this approach, which include the project manager, a project team and a project management system.

It was pointed out that to implement a strategy, change was required. Literature related to the management of organizational change was thus reviewed in section 2.4. The purpose was to examine a general change management model for implementing formalized project management. The

change management model of Conner and Lake (1988), which incorporates a process view of formulating and implementing a strategy, was presented and applied to the specific field of the research.

Where applicable, sections 2.3 and 2.4 included specific research propositions which will be used as the basis for the development of the research questionnaire for the empirical part of the research.

CHAPTER 3

RESEARCH PROBLEM AND METHODOLOGY

3.1 INTRODUCTION

This chapter describes the research problem and provides details of the research methodology utilized in examining of the research question.

Section 3.2 describes the research problem when viewed against both the macro- and microperspectives, previously outlined in chapter 1. These perspectives provide a suitable focus for the identification of the specific research problem. Also included is the statement of the research question derived from this research problem.

The general research methodology is described in section 3.3 while the detailed research design, including the conceptual frameworks, is illustrated in section 3.4.

Section 3.5 defines the research population. Section 3.6 describes the data collection procedures and examines the implications of the measures taken to safeguard both the reliability and validity of the data. Finally, section 3.7 gives the chapter summary.

3.2 RESEARCH PROBLEM

The research problem may be viewed against both the macro- and micro-perspectives which were previously described in chapter 1.

Viewed from a macroperspective (see section 1.1), the problem involves the expected increase in the demand for collective services, on the one

hand, and the provision of such services (together with the necessary physical facilities) with limited resources, on the other hand. Among the collective services related to the social needs of the population highlighted in this research are health, housing and education. The limited resources referred to above include money, materials and human labour.

Viewed from a microperspective (see section 1.2), the problem involves determining a suitable strategy to ensure the optimal provision of building accommodation by the responsible public sector work departments. It should be noted that optimal provision in this context refers to maximizing the output (the building accommodation) with the limited inputs (the resources).

Following on Kerzner's (1992:1) argument about the more appropriate nature of internal rather than external solutions, this study suggests that the implementation of formalized project management in public sector work departments could contribute significantly to a solution to ensure the optimal provision of building accommodation for the rendering of collective services.

The specific research problem entails empirically determining how formalized project management could both effectively and efficiently be implemented in public sector work departments.

The public sector work departments under consideration are limited to those responsible for and who further manage the construction activities by which the required building accommodation is provided for rendering the collective services.

The research question is formulated as follows:

How can project management as formal policy be implemented effectively and efficiently in public sector work departments involved in the construction activities by which building accommodation is provided for the rendering of collective services?

3.3 RESEARCH METHODOLOGY

Viewed from a broad classification of (1) experimental (2) quasi-experimental and (3) non-experimental scientific research methodologies, this research, following the two criteria suggested by Kerlinger (1986: 349), is classified as non-experimental. These principal criteria determine the extent of direct control that can be gained over the independent variables and involve experimental manipulation and random assignment.

With regard to the first criterion suggested by Kerlinger (1986: 348), the nature of the research does not permit experimental manipulation of the independent variables because in some cases their manifestations have already occurred and in others they are inherently or for practical reasons not manipulable.

As for the second criterion suggested by Kerlinger (1986: 349-350), the random assignment of subjects and treatments to groups is again not possible because self-selection has already occurred into (as will be defined later) the two different sets of comparison groups.

Based on a different classification, advanced by Emory (1985: 8) between pure scientific and applied research, this research is classified into the latter category because it is conducted in an actual field setting and is further directed to making practical decisions.

Another broad classification of the research purpose that is frequently made is that of research goals and the associated research strategies. Mouton and Marais (1985: 51) distinguish between three main types of research goals: exploratory, descriptive and explanatory research. An additional category, which is related to the latter type of research goal, is predictive research (Emory 1985: 9). As combinations of these research goals are possible (Cronje, Hammersma, Lucas & Smalley 1989: 45), it would not be appropriate to classify this research into a single category because the study includes both descriptive and explanatory research goals (see section 1.3).

With reference to the associated research strategy and given that, apart from a contextual interest (where a particular phenomenon is examined within the context of a specific field), this research also has a universal interest (interest would also extend to possibly applying the results of the research to other public sector departments involved in project-type work) (Cronje et al 1989: 46), the choice of the survey method emerges as an appropriate research strategy (Mouton & Marais 1985: 51).

3.4 RESEARCH DESIGN

Based on the research objectives listed in chapter 1, the research design must accommodate the two main focus areas of the study. The first, where the focus is on the content-related issues of strategy implementation and the second, where the focus is the process-related issues of implementing a strategy for formalized project management in public sector work departments.

The conceptual framework or research design for the content of implementation is illustrated in figure 3.1.

Figure 3.1: Conceptual framework: content of implementation

GROUP I: DEPARTMENT/ADMINISTRATION WHERE FORMALIZED PROJECT MANAGEMENT IS APPLIED				
LEVEL OF MANAGEMENT	IDENTIFY FACTORS	CLASSIFY FACTORS	EVALUATE AND PRIORITIZE FACTORS	EVALUATE AND PRIORITIZE FACTORS
TOP-LEVEL	SUCCESS DRIVING FORCES - very important/strong (1) - important/strong (2) - desirable/weak (3) - not important/no force (4)	PHILOSOPHICAL SITUATIONAL ORGANIZATIONAL JOB-DIMENSIONAL HUMAN	WITHIN MANAGERIAL LEVELS GROUP DIFFERENCES	BETWEEN APPLICATION EXTENT GROUP DIFFERENCES
	SUCCESS RESTRAINING FORCES - very restraining/strong (1) - restraining/strong (2) - undesirable/weak (3) - not important/no force (4)			
MIDDLE	AS FOR TOP-LEVEL MANAGEMENT			
LOWER	AS FOR TOP-LEVEL MANAGEMENT			

GROUP II: DEPARTMENT/ADMINISTRATION WHERE INFORMAL PROJECT MANAGEMENT IS APPLIED

GROUP III: DEPARTMENT/ADMINISTRATION WHERE NO PROJECT MANAGEMENT IS APPLIED

In summary the design entails:

- Identifying the success driving and the success restraining forces (factors) which will either positively or negatively contribute towards the implementation of formalized project management in public sector work departments.

- Classifying the factors into the categories of (1) philosophical (factors that relate to the principal requirements for implementation) (2) situational (factors that relate to the practical situations in which the departments operate) (3) organizational (factors that relate to the internal characteristics of the departments) (4) job-dimensional (factors that relate to the different roles/responsibilities of personnel within the departments) and (5) human-oriented (factors that relate to the characteristics of individuals or groups who work in the departments).

- Evaluating and prioritizing these factors according to their relative strength and importance within and between the three levels of the management hierarchy (Group A: top-level; Group B: middle; and Group C: lower or functional management) and also the three groups of public sector work departments found in the study (Group I: where formal project management is applied; Group II: where project management is informally applied; and Group III: where project management is not applied either formally or informally).

The conceptual framework or research design for the process of implementing is illustrated in figure 3.2. In summary the design entails:

- Determining the sources of change and the general orientation of the public sector work departments to change.

Figure 3.2: Conceptual framework: process of implementing

GROUP I: DEPARTMENT/ADMINISTRATION WHERE FORMALIZED PROJECT MANAGEMENT IS APPLIED

LEVEL OF MANAGEMENT	INITIATION OF CHANGE	EVALUATE SUITA-BILITY OF SOLUTION	FORMULATE CHANGE	IMPLEMENT CHANGE	INSTITUTIONALIZE CHANGE	WITHIN MANAGERIAL GROUP DIFFERENCES	BETWEEN APPLICATION GROUP DIFFERENCES
TOP-LEVEL	SOURCES OF CHANGE - Internal - External	CHANGE OBJECTS: - Task behaviour - Organizational processes - Strategic direction - Organizational culture	SELECTION CRITERIA: - Time - Extensiveness - Favourableness	CHANGE POLICIES	ORGANIZATIONAL ELEMENTS OF: - Structure - Leadership - Culture		
	GENERAL ORIENTATION	CHANGE METHODS: - Technological - Structural - Managerial - Human-oriented	CHANGE STRATEGIES: - Facilitative - Informational - Attitudinal - Political	TRANSITIONAL MANAGEMENT			
		PARTICIPATION: - Change managers - Change agents - Change targets					
MIDDLE	AS FOR TOP-LEVEL MANAGEMENT						
LOWER	AS FOR TOP-LEVEL MANAGEMENT						

GROUP II: DEPARTMENT/ADMINISTRATION WHERE INFORMAL PROJECT MANAGEMENT IS APPLIED

GROUP III: DEPARTMENT/ADMINISTRATION WHERE NO PROJECT MANAGEMENT IS APPLIED

- Evaluating the proposed solution of implementing formalized project management with regard to the objects and methods of change as well as the participants in the change process.

- Formulating a change strategy based on the specific selection criteria.

- Implementing the change by means of a change policy and transitional management.

- Institutionalizing the change through the organizational elements of structure, leadership and culture.

- Evaluating the process elements of implementation within and between the three managerial groups in the research (Groups A, B and C as defined before) and also the three groups of public sector work departments (Groups I, II and III as defined before).

- Assessing the theoretical probability of whether an implementation strategy developed in accordance with the results gained from the respondents could contribute significantly to the effective and efficient implementation of formalized project management in public sector work departments responsible for the construction activities by which building accommodation is provided for the rendering of collective services.

3.5 RESEARCH POPULATION

The research population encompasses all individuals who (1) work in a public sector work department, administration or division, where (2) projects are undertaken that (3) involve construction activities (4) to provide building accommodation for rendering collective services and (5) hold

either a top-level, middle or lower managerial position.

The individuals defined above were located (before 27 April 1994) in nineteen different public sector work departments in the Republic of South Africa, its independent states and self-governing territories. They included a central Department of Public Works and Land Affairs, the Department of Education and Training, the three own affairs administrations (House of Assembly, House of Delegates and House of Representatives), the four regional administrations of the Transvaal, the Orange Free State, Natal and the Cape Province, the independent TBVC states (Transkei, Bophuthatswana, Venda and Ciskei), and finally, the self-governing territories of KaNgwane, KwaNdebele, Gazankulu, Lebowa, Qwaqwa and KwaZulu.

In gathering the data for the empirical part of this research, the original aim was to first, include a representative sample of the individuals employed by only some of these departments who complied with the above research population requirements or criteria. After further investigation, the number of individuals who were expected to comply with the requirements were found to be relatively small and estimated to vary from between 10 and 30 individuals per department. This implied an average potential number of 380 individual respondents.

Given the relatively small number of potential individuals, it was then decided to contact all nineteen work departments and request that all their employees who complied with the research population criteria consider participation in the research project. Details of the actual number who eventually participated are provided in subsection 4.2.1.

3.6 DATA COLLECTION PROCEDURES

Based on the review on the related literature, seventy-five (75) research propositions were formulated and they cover both the content- and process-related issues of implementing formalized project management in public sector work departments.

As noted previously, the research strategy selected is the survey method. The research propositions were incorporated into a questionnaire which was first subjected to a pretest. The individuals selected for the pretest came from two different public sector work departments and also represented the different managerial levels indicated in the research design. The purpose of the pretest was to improve on the eventual accuracy of responses (or reliability of the questionnaire) (Kerlinger 1986: 405, 415) and on the construct validity of the measuring instrument, the questionnaire itself (Kerlinger 1986: 420), (Cook & Campbell 1976: 238-245).

On the basis of the responses of the pretest, the original questionnaire was then revised and included changes to the structure, wording and general appearance of the questionnaire. Further changes were also made after consultation with an experienced research statistician in order to improve on the "user-friendliness" of the questionnaire as well as to facilitate the analysis of the data later. The final questionnaire despatched to the respondents is attached as Annexure A. The same questionnaire, with all the research propositions indicated, is attached as Annexure B.

To gain maximum responses, it was decided to follow a two-step procedure for the despatch of the questionnaires. The first step was to direct a letter to the Director-Generals (heads) of all the work departments previously identified, in which they were informed about the research

project and their participation requested. In the event of their agreeing, they were also to ask to assist in identifying a contact person within their department, who could provide assistance to the researcher. The importance of the selection of the contact person was stressed by emphasizing the role such a person would be expected to perform. This role primarily involved the distribution and collection of the questionnaires to the selected individuals who complied with the research population criteria. The South African Department of Foreign Affairs provided valuable assistance in establishing contact with the work departments of the TBVC states.

The second step was the actual collection of the data. This entailed forwarding the questionnaires, either by post or personal delivery, to the respective work departments. A covering letter, addressed to the identified contact person, was included with detailed instructions regarding the distribution and collection of the questionnaires. After consultation with the identified contact person, the number of questionnaires sent out to each department was based on the estimated number of potential individuals who would comply with the above criteria.

The overall representativeness (number of valid responses acquired in relation to the true or real number of individuals of the defined research population) was expected to be high because of this indicated two-step procedure. However there was a probability that, due to the possibility of absenteeism because of sickness or leave, a number of individuals of the true research population might not complete a questionnaire. Furthermore, some individuals might be excluded because they would be incorrectly deemed not to comply with the research population criteria (this by their own doing or because of incorrect distribution), while they might in fact, actually have qualified. Applying some terminology used for statistical process control in acceptance sampling for attributes (Laufer 1984: 585-

586), the α error (rejection or excluding individuals deemed not to comply with criteria who ought to be included in the research population) was nevertheless expected to be small. However, because of this potential threat to the overall representativeness, clear guidelines were given to the contact person on applying the research population criteria correctly.

On the other hand, there was also a probability that a number of individuals who did not qualify to complete the research questionnaire, might eventually incorrectly have done so. To a certain extent, this error could later be controlled by examining the completed questionnaires and discarding those that obviously did not comply with the research population criteria.

There is further the chance that individuals could deliberately or by genuine mistake include themselves in the research population by providing false or misleading information. However, it is almost impossible to control or detect such occurrences. But the β error (acceptance or including individuals deemed to comply with the criteria who ought to be excluded from the research population) was however, also expected to be small.

These small judgmental values for the α and β measures described above will, to a large extent, contribute to the overall representativeness or content validity (Kerlinger 1986: 417-418) of the research.

While the purpose of the pretest was to improve on the eventual accuracy of responses (or reliability of data) and the construct validity of the measuring instrument (the questionnaire itself), the all-inclusive approach envisioned would attempt to secure the overall representativeness or content validity of the research. These measures will also later enhance the statistical conclusion validity (validity of conclusions drawn on the basis of the statistical evidence about presumed relationships) of the results for the

research (Cook et al 1976: 230-234). It should be noted that the three kinds of validity described, namely construct, content and statistical conclusion validity, are sometimes collectively referred to as internal validity (Cronje et al 1989: 46-47). Only two kinds of validity are then distinguished, the other being external validity (Emory 1985: 115).

External validity (validity of generalizing the results of the research across persons, groups, settings and to similar cases) (Cook et al 1976: 234-238); (Cronje et al 1989: 47) was not of leading concern for this research. While generalizing the findings of the research to other public sector departments involved in project-type work is not a specific objective of the research, it could and should be investigated in further follow-on studies.

3.7 CHAPTER SUMMARY

Viewing the research from both macro- and microperspectives provides a suitable focus for the identification of the specific research problem.

The specific research problem leads to the research question which entails determining how project management as formal policy can be implemented effectively and efficiently in public sector work departments involved in construction activities by which building accommodation is provided for the rendering of collective services.

The nature of the research is classified as non-experimental and is conducted in a practical field setting which is then further designated as applied research. The research goals include those associated with both descriptive and explanatory research. An appropriate research strategy followed is the survey method.

The research design consists of two main areas of focus in order to

accommodate both the content of implementation and the process of implementing formalized project management in public sector work departments. The conceptual frameworks or research designs for both were illustrated together with a brief description of the different aspects covered in each design.

The research population was then defined. It is limited to individuals who work in a public sector work department, where construction projects are undertaken by which building accommodation is provided for rendering collective services, and where such individuals either hold a top-level, middle or lower managerial position.

With regard to the data collection procedures used, all work departments in the Republic of South Africa, the self-governing territories and the TBVC states, are included in the research population. Furthermore, all individuals, who complied with the research population criteria, were requested to complete a research questionnaire. This questionnaire was finalized after a pretest in two public sector work departments and consultation with a research statistician. The purpose of the pretest was to improve on the reliability of the responses and the construct validity of the measuring instrument, the questionnaire itself.

The data was gathered through a two-step procedure, first by gaining the participation and cooperation of all the public sector work departments and, secondly, despatching and collecting the questionnaires from the individuals selected to participate in the research. This two-step procedure should ensure a high response rate, which will ultimately contribute to the overall representativeness or content validity of the research.

Finally, it was argued that the measures taken to safeguard the construct and content validity of the research would further also enhance the

statistical conclusion validity of the eventual results. It was noted that these three kinds of validity, collectively referred to as internal validity, were of prime concern, rather than the ability to generalize the results to other similar cases or the external validity of the findings.

CHAPTER 4

RESEARCH RESULTS

4.1 INTRODUCTION

This chapter presents the results of the research. It should be noted that, apart from brief clarifications of statistical terminology, no attempt is made to either discuss or analyze the results. The discussion and analysis of the results are provided in chapter 5.

Section 4.2 gives further details of the delineation and categorization of the research population. A description of the statistical techniques utilized for the different parts of the research questionnaire is also included. Section 4.3 describes the research results as related to part A of the research questionnaire. This part dealt with the general classification of the respondents. Section 4.4 presents the results for part B of the questionnaire. Part B examined the general orientation of respondents, working in public sector work departments to project management.

The results for part C of the questionnaire are presented in section 4.5. This part investigated the process-related issues of formulating and implementing a strategy for formalized project management. The content-related issues investigated were incorporated in part D of the questionnaire. The results for this part are presented in section 4.6.

Section 4.7 gives the results for the last portion of the questionnaire. In this part, an attempt was made to theoretically assess the chances of successfully implementing a project management strategy in public sector work departments, based on the preceding responses for the other portions of the research questionnaire. Finally, section 3.8 provides the chapter

summary.

4.2 RESEARCH POPULATION DELINEATION AND CATEGORIZATION

4.2.1 Research population delineation

As noted in section 3.6, their were nineteen public sector work departments in the Republic of South Africa, including the four independent TBVC states and the six self-governing territories before 27 April 1994. While research questionnaires were sent to all these institutions, a major political event in South Africa during the time the empirical part of this research was being conducted, had a direct effect on the number of work departments who decided to participate in the research and thus also on the number of potential respondents. This major political event was the first nonracial, democratic elections held on 27 April 1994, which brought about the reincorporation of the former independent states into South Africa and the abolishment of the self-governing territories.

As a consequence of the prevailing political conditions leading up to the elections only four questionnaires were received back from one of the then four independent states (80 were originally expected from all the states) and only sixteen from three of the six self-governing territories (60 were originally expected from all the territories). These poor responses and the fact that during the period of this research these work departments actually ceased to exist, called for their exclusion from the original intended research population. The results presented, then, do not include any participants from these work departments of the former independent states and self-governing territories.

The estimated total size of the research population was thus reduced from 380 to 240 potential participants. Of this revised figure, a total of 172

questionnaires were received back, representing a response rate of 72 percent. This high response rate compares favourably with other reported survey research by mail questionnaires where returns of less than 40 or 50 percent are common (Kerlinger 1986: 380). The high response rate is an advantage for later valid generalizations and its obtainment is partially attributed to the two-step approach followed in the despatch of questionnaires.

It should further be noted that, with the exception of one own affairs administration (notwithstanding several attempts to persuade the administration in question to consider participation), all the remaining departments and administrations completed and returned research questionnaires. By excluding this own affairs administration, the total number of outstanding questionnaires was thus reduced from 68 (i.e. 240 minus 172) to 48. These outstanding questionnaires thus either represented potential participants who exercised the choice of non-participation or of original over-optimistic estimates of the total number of potential participants. However, there is no reason to believe that these outstanding questionnaires represent any particular bias or other viewpoints or would significantly affect the obtained results although it is true that the results obtained do not reflect the opinions, beliefs or perceptions of this one own affairs administration who declined participation. While this may limit later generalization to some extent, their estimated number of potential participants was small (20) and with the new political dispensation following 27 April 1994, the administration in question actually no longer exists.

4.2.2 Research population categorization

Using the same the broad categorization utilized in both the conceptual frameworks for the content and process of implementation depicted in figures 3.1 and 3.2, the research results are generally categorized into two types of crossbreaks (Kerlinger 1986: 147, 160). The results are presented first for the three levels of management (i.e. Group A: top, Group B: middle and Group C: lower or functional management - note that these groups are generally referred to as managerial groups) and second, the three groups which reflect the extent to which project management is applied in the relevant department (i.e. Group I: formal application, Group II: informal application and Group III: no application - note that these three groups are generally referred to as application groups). An example of a 3 x 3 crossbreak, incorporating both the three levels of management and the three application groups, is illustrated in table 4.1.

Table 4.1: General 3 x 3 crossbreak

CROSSBREAK	EXTENT OF PROJECT MANAGEMENT APPLIED		
LEVEL OF MANAGEMENT	FORMAL GROUP I	INFORMAL GROUP II	NONE GROUP III
TOP GROUP A			
MIDDLE GROUP B			
LOWER GROUP C			

4.2.3 Statistical techniques utilized

All statistical results reported in this chapter were obtained through the use of the computer program, Statistical Analysis System (SAS version 6.06).

In questions where the results are reported by means of simple cross tabulations (all the questions in Part A, B and some questions in part C of the questionnaire), the values for chi-square (χ^2), the probability of a chance occurrence (p) and the contingency coefficients (C) are indicated at the bottom of each table. Results are only considered statistically significant (and only then indicated) when the obtained χ^2 values are greater than the critical χ^2 value for a significant level of 0.05 or lower (i.e. 0.025, 0.01 or 0.005). In such instances, the relationship under consideration is judged to be more than a chance occurrence. In appropriate cases, the mean ($\bar{X}$) and standard deviation (S) values are also indicated. In addition, a one-way analysis of variance (ANOVA) between the means of the categorised groups is also done for a significance level of $\propto = 0.05$. Where the indicated p-value (based on the obtained F-value) is smaller than this preselected $\propto$ value, the means between the groups is considered to be statistically significantly different. In such instances, the difference between the groups under consideration is judged to be more than a chance occurrence.

In questions where respondents were asked to indicate a rank order listing of items (the other questions in Part C of the questionnaire), the means reported is weighted averages, based on the following assigned weights: first choice = weight 1, second choice = weight 2, third choice = weight 3, and so on. The item which is then ranked first represents the one with the smallest (or lowest) value, the second placed item, the one with the second smallest value, and so on. One-way analysis of variances (ANOVA) is also carried out for these questions, again for a significance level of $\propto = 0.05$.

In questions where respondents were asked to indicate the relative importance of different identified factors (all the questions in Part D of the questionnaire), the means reported are again weighted averages, based on

the following assigned weights: very important = weight 1, important = weight 2, desirable = weight 3, and not important = weight 4. As before, the item which is ranked first (most important) represents the one with the smallest (or lowest) value. One-way analysis of variances (ANOVA) is once again carried out with the same significance level of $\propto = 0.05$. In addition to these statistical procedures, factor analysis is further done on the questions in Part D of the questionnaire.

Kerlinger (1986: 590) sees factor analysis as a construct validity tool. It is a statistical technique, where based on the correlations between items, "new factors" (also called constructs or new hypothetical variables) are explained by the underlying unities (also referred to as communilaties) or common factor variances of the items themselves (Kerlinger 1986: 570). The technique thus provides the correlations (also referred to as factor loadings) between the original variables (or items) with the new hypothetical factors or dimensions. In this study, the principal factor method was used and the solution was rotated by the varimax-criterion to obtain a maximum interpretable pattern.

In the last part of the questionnaire, respondents were asked to predict the chances of successfully implementing formalized project management, based on their answers in the two previous questions. It is thus appropriate in this question that, apart from simple cross tabulation and one-way analysis of variance of the results, correlational analysis be done with these other two questions. Here the Pearson product-moment correlation coefficients (r) and p-value under Ho are reported. Correlations are only considered statistically significant (and only then indicated) when the p-values are smaller than the significant level of 0.05. In such instances, the correlation between the results of the two questions is judged to be more than a chance occurrence.

4.3 CLASSIFICATION OF RESEARCH POPULATION

4.3.1 Question 1.1 (Code Q1)

The first question in part A of the research questionnaire asked respondents to indicate their current managerial position or level. The results were as indicated in tables 4.2 and 4.3.

Table 4.2: Number of respondents per managerial level

LEVEL OF MANAGEMENT	TOP N	MIDDLE N	LOWER N	TOTAL N
TOTAL	24	97	45	166
%T	15%	58%	27%	100%

Table 4.3: Number of respondents per application group

APPLICATION GROUP	FORMAL N	INFORMAL N	NONE N	TOTAL N
TOTAL	72	63	33	168
%T	43%	37%	20%	100%

4.3.2 Question 1.2 (Code Q2)

In the second question of part A respondents were asked to indicate the total number of years they had worked in a public sector department. The results were as indicated in tables 4.4 and 4.5.

Table 4.4: Number of years worked in a public sector department and one-way analysis of variance between means per managerial group

NUMBER OF YEARS	GROUP A N	GROUP B N	GROUP C N	TOTAL N %T
0 - 5	2	15	20	37 24%
6 - 10	2	30	14	46 29%
11 - 15	4	12	6	22 14%
16 - 20	9	19	2	30 19%
21 - 25	3	7	1	11 7%
26 - 30	1	3	0	4 3%
31 - 35	1	3	0	4 3%
36 - 40	0	2	0	2 1%
TOTAL %T	22 14%	91 58%	43 28%	156 100% 100%
$\bar{X}$ S	16.238 7.538	13.264 8.808	6.643 5.333	12.048# 7.226#

ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping
CODE Q2	13.93	0.0001*	(A;B)(C)

#Average of 3 groups
One-way ANOVA with $\alpha = 0.05$
*Result statistically significant at 0.05 level

Table 4.5: Number of years worked in a public sector department and one-way analysis of variance between means per application group

NUMBER OF YEARS	GROUP I N	GROUP II N	GROUP III N	TOTAL N %T
0 - 5	12	16	9	37 23%
6 - 10	22	16	10	48 30%
11 - 15	12	8	3	23 14%
16 - 20	13	14	3	30 19%
21 - 25	7	3	1	11 7%
26 - 30	1	2	1	4 3%
31 - 35	1	2	1	4 3%
36 - 40	0	0	2	2 1%
TOTAL %T	68 43%	61 38%	30 19%	159 100% 100%
$\bar{X}$ S	12.015 7.085	11.492 8.374	11.933 11.157	11.813# 8.872#
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
CODE Q2	0.07	0.9361	(1;2;3)	

#Average of 3 groups
One-way ANOVA with $\alpha = 0.05$

4.3.3 Question 1.3 (Code Q3)

The third question in part A of the questionnaire asked respondents to indicate their professional status. The results were as indicated in tables 4.6 and 4.7.

Table 4.6: Professional status per managerial group

PROFESSIONAL STATUS	GROUP A N c% r%	GROUP B N c% r%	GROUP C N c% r%	TOTAL N %T
ARCHITECT	6 25% 15%	26 27% 65%	8 18% 20%	40 24%
ENGINEER	12 50% 23%	26 27% 50%	14 32% 27%	52 32%
QUANTITY SURVEYOR	4 17% 11%	25 26% 67%	8 18% 22%	37 23%
OTHER	2 8% 6%	19 20% 54%	14 32% 40%	35 21%
TOTAL %T	24 15%	96 58%	44 27%	164 100% 100%

χ^2=9.698 p=0.138 C=0.236 N=164

Table 4.7: Professional status per application group

PROFESSIONAL STATUS	GROUP I N c% r%	GROUP II N c% r%	GROUP III N c% r%	TOTAL N %T
ARCHITECT	17 24% 42%	19 31% 46%	5 15% 12%	41 25%
ENGINEER	19 27% 36%	20 32% 38%	14 43% 26%	53 32%
QUANTITY SURVEYOR	13 18% 34%	13 21% 34%	12 36% 32%	38 23%
OTHER	22 31% 65%	10 16% 29%	2 6% 6%	34 20%
TOTAL %T	71 43%	62 37%	33 20%	166 100% 100%

χ^2=14.973 p=0.020* C=0.288 N=166
* Results statistically significant at 0.025 level where χ^2=14.449 for 6 degrees of freedom

4.3.4 Question 1.4 (Code Q4)

In the fourth question of part A respondents were asked to indicate their highest formal qualification. The results were as indicated in tables 4.8 and 4.9.

Table 4.8: Highest formal qualification per managerial group

HIGHEST FORMAL QUALIFICATION	GROUP A N c% r%	GROUP B N c% r%	GROUP C N c% r%	TOTAL N %T
DEGREE	18 75% 16%	66 71% 60%	26 63% 24%	110 69%
DIPLOMA	6 25% 19%	18 19% 58%	7 17% 23%	31 20%
OTHER	0 0% 0%	9 10% 53%	8 20% 47%	17 11%
TOTAL %T	24 15%	93 59%	41 26%	158 100% 100%

χ^2=6.447 p=0.168 C=0.198 N=158

Table 4.9: Highest formal qualification per application group

HIGHEST FORMAL QUALIFICATION	GROUP I N c% r%	GROUP II N c% r%	GROUP III N c% r%	TOTAL N %T
DEGREE	45 66% 40%	41 67% 36%	27 85% 24%	113 70%
DIPLOMA	14 21% 44%	15 25% 47%	3 9% 9%	32 20%
OTHER	9 13% 56%	5 8% 31%	2 6% 13%	16 10%
TOTAL %T	68 42%	61 38%	32 20%	161 100% 100%

χ^2=4.993 p=0.288 C=0.173 N=161

4.4 GENERAL ORIENTATION TO PROJECT MANAGEMENT

4.4.1 Question 2.1 (Code Q5)

The first question in part B of the questionnaire asked respondents to indicate only whether project management was currently being applied in their department or not. The results were as indicated in table 4.10.

Table 4.10: Current application of project management per managerial group

CURRENT APPLICATION	GROUP A N c% r%	GROUP B N c% r%	GROUP C N c% r%	TOTAL N %T
YES (*w1*)	18 75% 18%	54 61% 54%	28 67% 28%	100 65%
NO (*w2*)	6 25% 11%	35 39% 64%	14 33% 25%	55 35%
TOTAL %T	24 16%	89 57%	42 27%	155 100% 100%

χ^2=1.811 p=0.404 C=0.107 N=155

4.4.2 Question 2.2 (Code Q6)

The second question in part B of the questionnaire asked respondents to indicate to what extent project management was currently being applied in their departments. The result was as indicated in table 4.11.

Table 4.11: Extent of current project management application per managerial group

EXTENT OF APPLICATION	GROUP A N c% r%	GROUP B N c% r%	GROUP C N c% r%	TOTAL N %T
FORMAL	12 52% 17%	38 40% 55%	19 43% 28%	69 42%
INFORMAL	7 31% 11%	39 41% 64%	15 34% 25%	61 38%
NONE	4 17% 13%	18 19% 56%	10 23% 31%	32 20%
TOTAL %T	23 14%	95 59%	44 27%	162 100% 100%

χ^2=1.701 p=0.791 C=0.102 N=162

4.4.3 Question 2.3 (Code Q7/Q8)

The third question in part B of the questionnaire asked respondents to indicate what they believed the general attitude was to project management by first, their department generally and secondly, by themselves. The results were as indicated in tables 4.12, 4.13, 4.14 and 4.15.

Table 4.12: General attitude to project management of department and one-way analysis of variance between means per managerial group

ATTITUDE OF DEPARTMENT	GROUP A N c% r%	GROUP B N c% r%	GROUP C N c% r%	TOTAL N %T
POSITIVE (*w3*)	15 63% 18%	45 48% 52%	26 59% 30%	86 53%
NEUTRAL (*w2*)	7 29% 11%	43 46% 65%	16 36% 24%	66 41%
NEGATIVE (*w1*)	2 8% 20%	6 6% 60%	2 5% 20%	10 6%
TOTAL %T	24 15%	94 58%	44 27%	162 100% 100%
$\bar{X}$ S	2.522 0.658	2.413 0.612	2.535 0.589	2.490# 0.620#
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
CODE Q7	0.70	0.4979	(A;B;C)	

χ^2=3.132 p=0.536 C=0.138 N=162 #Average of 3 groups
One-way ANOVA with $\propto$=0.05

Table 4.13: General attitude to project management of department and one-way analysis of variance between means per application group

ATTITUDE OF DEPARTMENT	GROUP I N c% r%	GROUP II N c% r%	GROUP III N c% r%	TOTAL N %T
POSITIVE (*w3*)	53 75% 62%	22 36% 26%	10 32% 12%	85 52%
NEUTRAL (*w2*)	16 22% 24%	37 61% 54%	15 49% 22%	68 42%
NEGATIVE (*w1*)	2 3% 20%	2 3% 20%	6 19% 60%	10 6%
TOTAL %T	71 44%	61 37%	31 19%	163 100% 100%
$\bar{X}$ S	2.718 0.512	2.328 0.539	2.129 0.718	2.392# 0.590#
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
CODE Q7	14.35	0.0001**	(1)(2;3)	

χ^2=35.023 p=0.000* C=0.421 N=163 #Average of 3 groups
*Results statistically significant at 0.005 level where χ^2=14.860 for 4 degrees of freedom
One-way ANOVA with $\propto$=0.05
**Result statistically significant at 0.05 level

Table 4.14: General attitude to project management of respondents and one-way analysis of variance between means per managerial group

ATTITUDE OF RESPONDENTS	GROUP A N c% r%	GROUP B N c% r%	GROUP C N c% r%	TOTAL N %T
POSITIVE (*w3*)	21 91% 15%	78 82% 58%	36 82% 27%	135 83%
NEUTRAL (*w2*)	0 0% 0%	16 17% 73%	6 14% 27%	22 14%
NEGATIVE (*w1*)	2 9% 40%	1 1% 20%	2 4% 40%	5 3%
TOTAL %T	23 14%	95 59%	44 27%	162 100% 100%
$\bar{X}$ S	2.818 0.576	2.817 0.420	2.767 0.522	2.801# 0.506#
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
CODE Q8	0.17	0.8407	(A;B;C)	

χ^2=7.994 p=0.092 C=0.217 N=162 #Average of 3 groups
One-way ANOVA with $\propto$=0.05

Table 4.15: General attitude to project management of respondents and one-way analysis of variance between means per application group

ATTITUDE OF RESPONDENTS	GROUP I N c% r%	GROUP II N c% r%	GROUP III N c% r%	TOTAL N %T
POSITIVE (*w3*)	63 90% 46%	50 81% 36%	24 75% 18%	137 84%
NEUTRAL (*w2*)	4 6% 18%	12 19% 55%	6 19% 27%	22 13%
NEGATIVE (*w1*)	3 4% 60%	0 0% 0%	2 6% 40%	5 3%
TOTAL %T	70 43%	62 38%	32 19%	164 100% 100%
$\bar{X}$ S	2.857 0.460	2.806 0.398	2.688 0.592	2.784# 0.483#
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
CODE Q8	1.45	0.2378	(1;2;3)	

χ^2=9.412 p=0.052 C=0.233 N=164
One-way ANOVA with $\propto$=0.05

4.4.4 Question 2.4 (Code Q9/Q10)

In the fourth question of part B respondents were asked to indicate their general knowledge about project management with regard to first, its concepts and philosophy and secondly, its techniques, such as PERT/CPM. The results were as indicated in tables 4.16, 4.17, 4.18 and 4.19.

Table 4.16: General knowledge of project management concepts and philosophy and one-way analysis of variance between means per managerial group

KNOWLEDGE OF CONCEPTS & PHILOSOPHY	GROUP A N c% r%	GROUP B N c% r%	GROUP C N c% r%	TOTAL N %T
GOOD (*w3*)	12 50% 20%	33 35% 56%	14 31% 24%	59 35%
AVERAGE (*w2*)	10 42% 12%	52 54% 64%	20 44% 24%	82 50%
LIMITED (*w3*)	2 8% 8%	11 11% 46%	11 25% 46%	24 15%
TOTAL %T	24 15%	96 58%	45 27%	165 100% 100%
$\bar{X}$ S	2.435 0.654	2.245 0.640	2.046 0.751	2.242# 0.682#
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
CODE Q9	2.74	0.0678	(A;B)(B;C)	

χ^2=6.929 p=0.140 C=0.201 N=165 #Average of 3 groups
One-way ANOVA with α=0.05

Table 4.17: General knowledge of project management concepts and philosophy and one-way analysis of variance between means per application group

KNOWLEDGE OF CONCEPTS & PHILOSPHY	GROUP I N c% r%	GROUP II N c% r%	GROUP III N c% r%	TOTAL N %T
GOOD (*w3*)	31 43% 52%	17 27% 29%	11 33% 19%	59 35%
AVERAGE (*w2*)	35 49% 42%	35 57% 42%	14 43% 16%	84 50%
LIMITED (*w1*)	6 8% 25%	10 16% 42%	8 24% 33%	24 15%
TOTAL %T	72 43%	62 37%	33 20%	167 100% 100%
$\bar{X}$ S	2.347 0.632	2.113 0.655	2.091 0.765	2.184# 0.684#
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
CODE Q9	2.70	0.0705	(1;2;3)	

χ^2=7.463 p=0.113 C=0.207 N=167 #Average of 3 groups
One-way ANOVA with α=0.05

Table 4.18: General knowledge of project management techniques and one-way analysis of variance between means per managerial group

KNOWLEDGE OF TECHNIQUES	GROUP A N c% r%	GROUP B N c% r%	GROUP C N c% r%	TOTAL N %T
GOOD (*w3*)	6 26% 17%	22 24% 61%	8 19% 22%	36 23%
AVERAGE (*w2*)	12 52% 20%	30 32% 50%	18 42% 30%	60 38%
LIMITED (*w1*)	5 22% 8%	41 44% 65%	17 39% 27%	63 39%
TOTAL %T	23 14%	93 59%	43 27%	159 100% 100%
$\bar{X}$ S	2.046 0.706	1.813 0.802	1.786 0.742	1.882# 0.750#
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
CODE Q10	0.92	0.3989	(A;B;C)	

χ^2=5.000 p=0.287 C=0.175 N=159 #Average of 3 groups
One-way ANOVA with α=0.05

Table 4.19: General knowledge of project management techniques and one-way analysis of variance between means per application group

KNOWLEDGE OF TECHNIQUES	GROUP I N c% r%	GROUP II N c% r%	GROUP III N c% r%	TOTAL N %T
GOOD (*w3*)	20 29% 56%	8 13% 22%	8 25% 22%	36 22%
AVERAGE (*w2*)	26 37% 43%	27 46% 44%	8 25% 13%	61 38%
LIMITED (*w1*)	24 34% 37%	24 41% 38%	16 50% 25%	64 40%
TOTAL %T	70 43%	59 37%	32 20%	161 100%
$\bar{X}$ S	1.943 0.796	1.729 0.691	1.750 0.842	1.807# 0.776#
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
CODE Q10	1.44	0.2410	(1;2;3)	

χ^2=7.114 p=0.130 C=0.206 N=161 #Average of 3 groups
One-way ANOVA with α=0.05

4.5 MANAGEMENT OF CHANGE

4.5.1 Question 3.1 (Code Q11)

The first question in part C of the questionnaire asked respondents to estimate the chances of successfully implementing project management in their department, given expressly that **no changes were made** in the way it currently operated. The results were as indicated in tables 4.20 and 4.21.

Table 4.20: Chances of successfully implementing project management with no changes made and one-way analysis of variance between means per managerial group

CHANCES OF IMPLEMENTING	GROUP A N c% r%	GROUP B N c% r%	GROUP C N c% r%	TOTAL N %T
SMALL (0-24%)(*w1*)	4 17% 12%	20 21% 59%	10 22% 29%	34 21%
LIMITED (25-49%)(*w2*)	5 21% 11%	33 34% 70%	9 20% 19%	47 28%
REASONBLE (50-74%)(*w3*)	12 50% 18%	35 36% 54%	18 40% 28%	65 39%
GOOD (75-99%)(*w4*)	3 12% 15%	9 9% 45%	8 18% 40%	20 12%
TOTAL %T	24 15%	97 58%	45 27%	166 100% 100%
$\bar{X}$ S	2.565 0.929	2.337 0.912	2.523 1.036	2.475# 0.959#
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
CODE Q11	0.88	0.4186	(A;B;C)	

χ^2=5.737 p=0.453 C=0.183 N=166 #Average of 3 groups
One-way ANOVA with $\propto$=0.05

Table 4.21: Chances of successfully implementing project management with no changes made and one-way analysis of variance between means per application group

CHANCES OF IMPLEMENTING	GROUP I N c% r%	GROUP II N c% r%	GROUP III N c% r%	TOTAL N %T
SMALL (0-24%)(*w1*)	10 14% 29%	13 21% 37%	12 36% 34%	35 21%
LIMITED (25-49%)(*w2*)	16 22% 33%	17 27% 36%	15 46% 31%	48 29%
REASONBLE (50-74%)(*w3*)	32 44% 50%	27 43% 42%	5 15% 8%	64 38%
GOOD (75-99%)(*w4*)	14 20% 67%	6 9% 28%	1 3% 5%	21 12%
TOTAL %T	72 43%	63 37%	33 20%	168 100% 100%
$\bar{X}$ S	2.694 0.944	2.413 0.927	1.849 0.795	2.319# 0.889#
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
CODE Q11	9.77	0.0001**	(1;2)(3)	

χ^2=21.141 p=0.002* C=0.334 N=168
*Results statistically significant at a 0.005 level where χ^2=18.548 for 6 degrees of freedom
One-way ANOVA with $\propto$=0.05
**Result statistically significant at a 0.05 level

4.5.2 Question 3.2 (Code Q12/Q13)

In the second question of part C respondents were asked to judge the past performance of their department with regard to first, it meeting its objectives and secondly, it utilizing its resources management efficiently. The results were as indicated in tables 4.22, 4.23, 4.24 and 4.25.

Table 4.22: Past performance of department in meeting its objectives and one-way analysis of variance between means per managerial group

PAST PERFORMANCE OBJECTIVES	GROUP A N c% r%	GROUP B N c% r%	GROUP C N c% r%	TOTAL N %T
GOOD (*w3*)	7 29% 12%	36 38% 62%	15 34% 26%	58 35%
AVERAGE (*w2*)	17 71% 19%	50 52% 55%	24 55% 26%	91 56%
POOR (*w1*)	0 0% 0%	10 10% 67%	5 11% 33%	15 9%
TOTAL %T	24 15%	96 58%	44 27%	164 100% 100%
$\bar{X}$ S	2.304 0.464	2.266 0.640	2.233 0.642	2.268# 0.582#
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
CODE Q12	0.10	0.9021	(A;B;C)	

χ^2=4.232 p=0.376 C=0.159 N=164 #Average of 3 groups
One-way ANOVA with $\propto$=0.05

Table 4.23: Past performance of department in meeting its objectives and one-way analysis of variance between means per application group

PAST PERFORMANCE OBJECTIVES	GROUP I N c% r%	GROUP II N c% r%	GROUP III N c% r%	TOTAL N %T
GOOD (*w3*)	32 45% 53%	21 35% 34%	8 24% 13%	61 37%
AVERAGE (*w2*)	34 47% 39%	33 54% 37%	21 64% 24%	88 53%
POOR (*w1*)	6 8% 35%	7 11% 41%	4 12% 24%	17 10%
TOTAL %T	72 43%	61 37%	33 20%	166 100% 100%
$\bar{X}$ S	2.361 0.635	2.230 0.643	2.121 0.600	2.237# 0.626#
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
CODE Q12	1.79	0.1705	(1;2;3)	

χ^2=4.287 p=0.369 C=0.159 N=166 #Average of 3 groups
One-way ANOVA with $\propto$=0.05

Table 4.24: Past performance of department in utilizing resources and one-way analysis of variance between means per managerial group

PAST PERFORMANCE RESOURCES	GROUP A N c% r%	GROUP B N c% r%	GROUP C N c% r%	TOTAL N %T
GOOD (*w3*)	4 17% 10%	26 27% 67%	9 21% 23%	39 24%
AVERAGE (*w2*)	17 71% 18%	54 57% 57%	23 55% 25%	94 58%
POOR (*w1*)	3 12% 11%	15 16% 53%	10 24% 36%	28 18%
TOTAL %T	24 15%	95 59%	42 26%	161 100% 100%
$\bar{X}$ S	2.044 0.550	2.118 0.650	1.976 0.680	2.046# 0.627#
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
CODE Q13	0.70	0.4972	(A;B;C)	

χ^2=3.324 p=0.505 C=0.142 N=161 #Average of 3 groups
One-way ANOVA with $\propto$=0.05

Table 4.25: Past performance of department in utilizing its resources and one-way analysis of variance between means per application group

PAST PERFORMANCE RESOURCES	GROUP I N c% r%	GROUP II N c% r%	GROUP III N c% r%	TOTAL N %T
GOOD (*w3*)	20 28% 50%	12 20% 30%	8 25% 20%	40 25%
AVERAGE (*w2*)	41 59% 44%	36 59% 39%	16 50% 17%	93 57%
POOR (*w1*)	9 13% 30%	13 21% 43%	8 25% 27%	30 18%
TOTAL %T	70 43%	61 37%	32 20%	163 100% 100%
$\bar{X}$ S	2.157 0.629	1.984 0.645	2.000 0.718	2.047# 0.664#
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
CODE Q13	1.33	0.2684	(1;2;3)	

χ^2=3.611 p=0.461 C=0.147 N=163 #Average of 3 groups
One-way ANOVA with $\propto$=0.05

4.5.3 Question 3.3 (Code Q14)

The third question in part C of the questionnaire asked respondents to indicate whether they believed there were disrupting forces which restrained the department from obtaining optimal performance. The results were as indicated in tables 4.26 and 4.27.

Table 4.26: Disrupting forces which restrain the department obtaining optimal performance and one-way analysis of variance between means per managerial group

DISRUPTING FORCES	GROUP A N c% r%	GROUP B N c% r%	GROUP C N c% r%	TOTAL N %T
YES (*w1*)	21 88% 16%	80 82% 60%	33 75% 24%	134 81%
NO (*w2*)	3 12% 10%	17 18% 55%	11 25% 35%	31 19%
TOTAL %T	24 14%	97 59%	44 27%	165 100% 100%
$\bar{X}$ S	1.130 0.338	1.168 0.382	1.256 0.438	1.185# 0.386#
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
CODE Q14	1.02	0.3644	(A;B;C)	

χ^2=1.836 p=0.399 C=0.105 N=165 #Average of 3 groups
One-way ANOVA with $\propto$=0.05

Table 4.27: Disrupting forces which restrain the department obtaining optimal performance and one-way analysis of variance between means per application group

DISRUPTING FORCES	GROUP I N c% r%	GROUP II N c% r%	GROUP III N c% r%	TOTAL N %T
YES (*w1*)	60 85% 44%	51 81% 38%	25 76% 18%	136 81%
NO (*w2*)	11 15% 35%	12 19% 39%	8 24% 26%	31 19%
TOTAL %T	71 42%	63 38%	33 20%	167 100% 100%
$\bar{X}$ S	1.155 0.364	1.190 0.396	1.242 0.435	1.196# 0.398#
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
CODE Q14	0.57	0.5656	(1;2;3)	

χ^2=1.157 p=0.561 C=0.083 N=167 #Average of 3 groups
One-way ANOVA with $\propto$=0.05

4.5.4 Question 3.4 (Code Q15)

In the fourth question of part C respondents were asked to indicate whether they believed that some adjustments inside the department were necessary to maintain or improve the department's performance. The results were as indicated in tables 4.28 and 4.29.

Table 4.28: Adjustments necessary inside the department to maintain or improve its performance and one-way analysis of variance between means per managerial group

ADJUSTMENTS NEEDED	GROUP A N c% r%	GROUP B N c% r%	GROUP C N c% r%	TOTAL N %T
YES (*w1*)	18 78% 14%	79 85% 60%	35 83% 26%	132 84%
NO (*w2*)	5 22% 19%	14 15% 54%	7 17% 27%	26 16%
TOTAL %T	23 14%	93 59%	42 27%	158 100% 100%
$\bar{X}$ S	1.227 0.422	1.154 0.360	1.171 0.377	1.184# 0.386#
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
CODE Q15	0.34	0.7152	(A;B;C)	

χ^2=0.601 p=0.740 C=0.062 N=158 #Average of 3 groups
One-way ANOVA with $\propto$=0.05

Table 4.29: Adjustments necessary inside the department to maintain or improve its performance and one-way analysis of variance between means per application group

ADJUSTMENTS NEEDED	GROUP I N c% r%	GROUP II N c% r%	GROUP III N c% r%	TOTAL N %T
YES (*w1*)	57 81% 43%	49 83% 37%	26 87% 20%	132 83%
NO (*w2*)	13 19% 48%	10 17% 37%	4 13% 15%	27 17%
TOTAL %T	70 44%	59 37%	30 19%	159 100% 100%
$\bar{X}$ S	1.186 0.392	1.169 0.378	1.133 0.346	1.163# 0.372#
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
CODE Q15	0.20	0.8181	(1;2;3)	

χ^2=0.409 p=0.815 C=0.051 N=159 #Average of 3 groups
One-way ANOVA with $\propto$=0.05

4.5.5 Question 3.5 (Code Q16)

In the fifth question of part C respondents were asked to indicate which of the two listed forces provided the greatest stimulus for change inside their departments. The results were as indicated in tables 4.30 and 4.31.

Table 4.30: Type of force providing the greatest stimulus for change inside department and one-way analysis of variance between means per managerial group

TYPE OF FORCE	GROUP A N c% r%	GROUP B N c% r%	GROUP C N c% r%	TOTAL N %T
EXTERNAL (*w1*)	11 48% 12%	54 57% 61%	24 56% 27%	89 55%
INTERNAL (*w2*)	12 52% 17%	41 43% 57%	19 44% 26%	72 45%
TOTAL %T	23 14%	95 59%	43 27%	161 100% 100%
$\bar{X}$ S	1.500 0.511	1.419 0.498	1.429 0.502	1.449# 0.504#
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
CODE Q16	0.23	0.7915	(A;B;C)	

χ^2=0.616 p=0.735 C=0.062 N=161 #Average of 3 groups
One-way ANOVA with $\propto$=0.05

Table 4.31: Type of force providing the greatest stimulus for change inside department and one-way analysis of variance between means per application group

TYPE OF FORCE	GROUP I N c% r%	GROUP II N c% r%	GROUP III N c% r%	TOTAL N %T
EXTERNAL (*w1*)	42 59% 46%	33 54% 36%	16 52% 18%	91 56%
INTERNAL (*w2*)	29 41% 40%	28 46% 39%	15 48% 21%	72 44%
TOTAL %T	71 44%	61 37%	31 19%	163 100% 100%
$\bar{X}$ S	1.409 0.495	1.459 0.502	1.484 0.508	1.451# 0.502#
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
CODE Q16	0.30	0.7387	(1;2;3)	

χ^2=0.616 p=0.735 C=0.061 N=163 #Average of 3 groups
One-way ANOVA with $\propto$=0.05

4.5.6 Question 3.6 (Code Q17/18)

The sixth question of part C asked respondents to indicate the general attitude of their department towards change, firstly in how changes were acted upon and secondly, how often changes were initiated. The results were as indicated in tables 4.32, 4.33, 4.34 and 4.35.

Table 4.32: General attitude of department on acting on changes and one-way analysis of variance between means per managerial group

ACTION TOWARDS CHANGES	GROUP A N c% r%	GROUP B N c% r%	GROUP C N c% r%	TOTAL N %T
EMBRACED (*w1*)	13 59% 18%	39 42% 55%	19 42% 27%	71 44%
RESISTED (*w2*)	9 41% 10%	54 58% 61%	26 58% 29%	89 56%
TOTAL %T	22 14%	93 58%	45 28%	160 100% 100%
$\bar{X}$ S	1.381 0.503	1.582 0.496	1.591 0.499	1.518# 0.499#
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
CODE Q17	1.54	0.2173	(A;B;C)	

χ^2=2.239 p=0.326 C=0.117 N=160 #Average of 3 groups
One-way ANOVA with $\propto$=0.05

Table 4.33: General attitude of department on acting on changes and one-way analysis of variance between means per application group

ACTION TOWARDS CHANGES	GROUP I N c% r%	GROUP II N c% r%	GROUP III N c% r%	TOTAL N %T
EMBRACED (*w1*)	34 59% 18%	25 42% 55%	11 42% 27%	70 44%
RESISTED (*w2*)	33 41% 10%	36 58% 61%	21 58% 29%	90 56%
TOTAL %T	67 42%	61 38%	32 20%	160 100% 100%
$\bar{X}$ S	1.493 0.504	1.590 0.496	1.656 0.483	1.580# 0.494#
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
CODE Q17	1.33	0.2675	(1;2;3)	

χ^2=2.665 p=0.264 C=0.128 N=160 #Average of 3 groups
One-way ANOVA with $\propto$ = 0.05

Table 4.34: General attitude of department towards initiation of changes and one-way analysis of variance between means per managerial group

INITIATION OF CHANGE	GROUP A N c% r%	GROUP B N c% r%	GROUP C N c% r%	TOTAL N %T
FREQUENTLY (*w1*)	13 54% 18%	41 43% 58%	17 39% 24%	71 44%
INFREQUENTLY (*w2*)	11 46% 12%	54 57% 59%	27 61% 29%	92 56%
TOTAL %T	24 15%	95 58%	44 27%	163 100% 100%
$\bar{X}$ S	1.478 0.509	1.570 0.498	1.628 0.493	1.559# 0.500#
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
CODE Q18	0.68	0.5076	(A;B;C)	

χ^2=1.538 p=0.463 C=0.097 N=163 #Average of 3 groups
One-way ANOVA with $\propto$=0.05

Table 4.35: General attitude of department towards initiation of changes and one-way analysis of variance between means per application group

INITIATION OF CHANGE	GROUP I N c% r%	GROUP II N c% r%	GROUP III N c% r%	TOTAL N %T
FREQUENTLY (*w1*)	33 47% 47%	28 45% 39%	10 30% 14%	71 43%
INFREQUENTLY (*w2*)	37 53% 39%	34 55% 36%	23 70% 25%	94 57%
TOTAL %T	70 42%	62 38%	33 20%	165 100% 100%
$\bar{X}$ S	1.529 0.503	1.548 0.502	1.700 0.467	1.592# 0.491#
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
CODE Q18	1.39	0.2527	(1;2;3)	

χ^2=2.778 p=0.249 C=0.129 N=165 #Average of 3 groups
One-way ANOVA with $\propto$=0.05

4.5.7 Question 3.7 (Code Q19)

The seventh question of part C asked respondents to indicate whether they believed that implementing project management would contribute towards solutions to deal with the disrupting forces which affect their department. The results were as indicated in tables 4.36 and 4.37.

Table 4.36: Contribution of implementing project management to deal with forces and one-way analysis of variance between means per managerial group

CONTRIBUTION OF PROJECT MANAGEMENT	GROUP A N c% r%	GROUP B N c% r%	GROUP C N c% r%	TOTAL N %T
YES (*w1*)	20 83% 16%	71 76% 56%	35 81% 28%	126 78%
NO (*w2*)	4 17% 11%	23 24% 66%	8 19% 23%	35 22%
TOTAL %T	24 15%	94 58%	43 27%	161 100% 100%
$\bar{X}$ S	1.174 0.381	1.250 0.432	1.190 0.394	1.205# 0.402#
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
CODE Q19	0.48	0.6225	(A;B;C)	

χ^2=1.023 p=0.600 C=0.079 N=161 #Average of 3 groups
One-way ANOVA with $\propto$=0.05

Table 4.37: Contribution of implementing project management to deal with forces and one-way analysis of variance between means per application group

CONTRIBUTION OF PROJECT MANAGEMENT	GROUP I N c% r%	GROUP II N c% r%	GROUP III N c% r%	TOTAL N %T
YES (*w1*)	53 76% 41%	51 82% 40%	24 77% 19%	128 79%
NO (*w2*)	17 24% 49%	11 18% 31%	7 23% 20%	35 21%
TOTAL %T	70 43%	62 38%	31 19%	163 100% 100%
$\bar{X}$ S	1.243 0.432	1.177 0.385	1.226 0.425	1.215# 0.414#
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
CODE Q19	0.43	0.6540	(1;2;3)	

χ^2=0.863 p=0.650 C=0.073 N=163 #Average of 3 groups
One-way ANOVA with $\propto$=0.05

4.5.8 Question 3.8 (Code Q20)

The eighth question of part C asked respondents to indicate how many changes or adjustments were needed to implement project management in their department effectively and efficiently. The results were as indicated in tables 4.38 and 4.39.

Table 4.38: Number of changes needed to implement project management and one-way analysis of variance between means per managerial group

NUMBER OF CHANGES NEEDED	GROUP A N c% r%	GROUP B N c% r%	GROUP C N c% r%	TOTAL N %T
MANY (*w1*)	5 21% 10%	30 31% 61%	14 32% 29%	49 29%
SOME (*w2*)	17 71% 15%	67 69% 59%	30 67% 26%	114 69%
NONE (*w3*)	2 8% 67%	0 0% 0%	1 1% 33%	3 2%
TOTAL %T	24 15%	97 58%	45 27%	166 100% 100%
$\bar{X}$ S	1.870 0.537	1.684 0.465	1.705 0.506	1.753# 0.503#
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
CODE Q20	1.34	0.2655	(A;B;C)	

χ^2=8.214 p=0.084 C=0.217 N=166 #Average of 3 groups
One-way ANOVA with $\propto$=0.05

Table 4.39: Number of changes needed to implement project management and one-way analysis of variance between means per application group

NUMBER OF CHANGES NEEDED	GROUP I N c% r%	GROUP II N c% r%	GROUP III N c% r%	TOTAL N %T
MANY (*w1*)	16 22% 31%	21 33% 40%	15 45% 29%	52 31%
SOME (*w2*)	54 75% 48%	41 65% 36%	18 55% 16%	113 67%
NONE (*w3*)	2 3% 67%	1 2% 33%	0 0% 0%	3 2%
TOTAL %T	72 43%	63 37%	33 20%	168 100% 100%
$\bar{X}$ S	1.806 0.464	1.683 0.502	1.545 0.506	1.678# 0.491#
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
CODE Q20	3.37	0.0367*	(1;2)(2;3)	

χ^2=6.609 p=0.158 C=0.195 N=168 #Average of 3 groups
One-way ANOVA with $\propto$=0.05
* Result statistically significant at 0.05 level

4.5.9 Question 3.9 (Code Q21/Q22/Q23/Q24)

The ninth question of part C asked respondents to indicate whether certain statements assuming that project management would be implemented in their departments were true or false. The first statement postulated that substantial time was needed, the second, that extensive change would be indicated, the third, that the general attitude of personnel would be unfavourable, and finally, that an outside consultant would be best to manage the implementation. The results were as indicated in tables 4.40 to 4.47.

Table 4.40: Statement: Substantial time is needed to implement project management and one-way analysis of variance between means per managerial group

SUBSTANTIAL TIME IS NEEDED	GROUP A N c% r%	GROUP B N c% r%	GROUP C N c% r%	TOTAL N %T
TRUE (*w1*)	8 40% 9%	62 70% 65%	25 60% 26%	95 63%
FALSE (*w2*)	12 60% 22%	26 30% 47%	17 40% 31%	55 37%
TOTAL %T	20 13%	88 59%	42 28%	150 100%
$\bar{X}$ S	1.632 0.503	1.291 0.459	1.415 0.497	1.446# 0.486#
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
CODE Q21	4.28	0.0156**	(A;C)(B;C)	

χ^2=6.873 p=0.032* C=0.209 N=150 #Average of 3 groups
*Results statistically significant at 0.05 level where χ^2=5.991 for 2 degrees of freedom
One-way ANOVA with $\propto$=0.05
**Result statistically significant at 0.05 level

Table 4.41: Statement: Substantial time is needed to implement project management and one-way analysis of variance between means per application group

SUBSTANTIAL TIME IS NEEDED	GROUP I N c% r%	GROUP II N c% r%	GROUP III N c% r%	TOTAL N %T
TRUE (*w1*)	40 63% 43%	38 66% 40%	16 59% 17%	94 63%
FALSE (*w2*)	24 37% 44%	20 34% 36%	11 41% 20%	55 37%
TOTAL %T	64 43%	58 39%	27 18%	149 100%
$\bar{X}$ S	1.375 0.488	1.345 0.479	1.407 0.501	1.376# 0.489#
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
CODE Q21	0.16	0.8520	(1;2;3)	

χ^2=0.326 p=0.849 C=0.047 N=149 #Average of 3 groups
One-way ANOVA with $\propto$=0.05

Table 4.42: Statement: Extensive change would be indicated to implement project management and one-way analysis of variance between means per managerial group

EXTENSIVE CHANGE INDICATED	GROUP A N c% r%	GROUP B N c% r%	GROUP C N c% r%	TOTAL N %T
TRUE (*w1*)	6 30% 9%	44 52% 65%	18 45% 26%	68 47%
FALSE (*w2*)	14 70% 18%	40 48% 53%	22 55% 29%	76 53%
TOTAL %T	20 14%	84 58%	40 28%	144 100% 100%
$\bar{X}$ S	1.684 0.470	1.488 0.502	1.564 0.504	1.579# 0.492#
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
CODE Q22	1.28	0.2814	(A;B;C)	

χ^2=3.356 p=0.187 C=0.151 N=144 #Average of 3 groups
One-way ANOVA with $\propto$=0.05

Table 4.43: Statement: Extensive change would be indicated to implement project management and one-way analysis of variance between means per application group

EXTENSIVE CHANGE INDICATED	GROUP I N c% r%	GROUP II N c% r%	GROUP III N c% r%	TOTAL N %T
TRUE (*w1*)	22 36% 32%	30 55% 43%	17 61% 25%	69 48%
FALSE (*w2*)	39 64% 52%	25 45% 33%	11 39% 15%	75 52%
TOTAL %T	61 42%	55 38%	28 20%	144 100% 100%
$\bar{X}$ S	1.639 0.484	1.455 0.503	1.393 0.497	1.496# 0.495#
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
CODE Q22	3.19	0.0440**	(1;2;3)	

χ^2=6.239 p=0.044* C=0.204 N=144 #Average of 3 groups
*Results statistically significant at 0.05 level where χ^2=5.991 for 2 degrees of freedom
One-way ANOVA with $\propto$=0.05
**Result statistically significant at 0.05 level

Table 4.44: Statement: The general attitude of personnel is unfavourable to implement project management and one-way analysis of variance between means per managerial group

GENERAL ATTITUDE UNFAVOURABLE	GROUP A N c% r%	GROUP B N c% r%	GROUP C N c% r%	TOTAL N %T
TRUE (*w1*)	7 30% 11%	39 47% 60%	19 48% 29%	65 45%
FALSE (*w2*)	16 70% 20%	44 53% 54%	21 52% 26%	81 55%
TOTAL %T	23 16%	83 57%	40 27%	146 100% 100%
$\bar{X}$ S	1.682 0.470	1.531 0.502	1.513 0.506	1.575# 0.493#
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
CODE Q23	0.93	0.3958	(A;B;C)	

χ^2=2.196 p=0.334 C=0.122 N=146 #Average of 3 groups
One-way ANOVA with $\propto$=0.05

Table 4.45: Statement: The general attitude of personnel is unfavourable to implement project management and one-way analysis of variance between means per application group

GENERAL ATTITUDE UNFAVOURABLE	GROUP I N c% r%	GROUP II N c% r%	GROUP III N c% r%	TOTAL N %T
TRUE (*w1*)	28 43% 40%	27 51% 39%	15 50% 21%	70 47%
FALSE (*w2*)	37 57% 48%	26 49% 33%	15 50% 19%	78 53%
TOTAL %T	65 44%	53 36%	30 20%	148 100% 100%
$\bar{X}$ S	1.569 0.499	1.491 0.505	1.500 0.509	1.520# 0.504#
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
CODE Q23	0.41	0.6635	(1;2;3)	

χ^2=0.835 p=0.659 C=0.075 N=148 #Average of 3 groups
One-way ANOVA with α=0.05

Table 4.46: Statement: An outside consultant is best to manage implementation of project management and one-way analysis of variance between means per managerial group

OUTSIDE CONSULTANT BEST	GROUP A N c% r%	GROUP B N c% r%	GROUP C N c% r%	TOTAL N %T
TRUE (*w1*)	8 36% 12%	38 44% 56%	22 51% 32%	68 45%
FALSE (*w2*)	14 64% 17%	48 56% 58%	21 49% 25%	83 55%
TOTAL %T	22 15%	86 57%	43 28%	151 100% 100%
$\bar{X}$ S	1.619 0.492	1.548 0.500	1.500 0.506	1.556# 0.499#
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
CODE Q24	0.40	0.6721	(A;B;C)	

χ^2=1.346 p=0.510 C=0.094 N=151 #Average of 3 groups
One-way ANOVA with α=0.05

Table 4.47: Statement: An outside consultant is best to manage implementation of project management and one-way analysis of variance between means per application group

OUTSIDE CONSULTANT BEST	GROUP I N c% r%	GROUP II N c% r%	GROUP III N c% r%	TOTAL N %T
TRUE (*w1*)	25 41% 36%	25 42% 36%	20 65% 28%	70 46%
FALSE (*w2*)	36 59% 44%	34 58% 42%	11 35% 14%	81 54%
TOTAL %T	61 40%	59 39%	31 21%	151 100% 100%
$\bar{X}$ S	1.590 0.496	1.576 0.498	1.355 0.486	1.507# 0.493#
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
CODE Q24	2.64	0.0749	(1;2;3)	

χ^2=5.196 p=0.074 C=0.182 N=151 #Average of 3 groups
One-way ANOVA with $\propto$=0.05

4.5.10 Question 3.10 (Code Q25/Q26/Q27/Q28)

The tenth question of part C asked respondents to indicate a rank order for different items with the greatest priority for change, for project management to be implemented. The first item concerned the functions and tasks of personnel, the second, the control and decision procedures inside the department, the third, the overall direction and objectives of the department, and finally, the attitudes of individuals and groups. The results were as indicated in tables 4.48 and 4.49.

Table 4.48: Rank order of items with the greatest priority for change to implement project management and one-way analysis of variance between means per managerial group

ITEM CODES	GROUP A $\bar{X}$ RO S N=23	GROUP B $\bar{X}$ RO S N=97	GROUP C $\bar{X}$ RO S N=45	TOTAL# $\bar{X}$ RO S N=165
Q25 FUNCTIONS	2.435 (2) 1.841	2.374 (2) 1.024	2.342 (2) 0.955	2.384 (2) 1.273
Q26 PROCEDURES	2.136 (1) 0.869	2.292 (1) 0.976	2.203 (1) 0.901	2.210 (1) 0.915
Q27 DIRECTION	2.727 (3) 1.369	2.585 (3) 1.125	2.851 (4) 1.216	2.721 (3) 1.236
Q28 ATTITUDES	3.046 (4) 1.041	2.773 (4) 1.148	2.605 (3) 1.171	2.808 (4) 1.120

ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping
Q25	0.05	0.9523	(A;B;C)
Q26	0.30	0.7403	(A;B;C)
Q27	0.79	0.4561	(A;B;C)
Q27	1.10	0.3367	(A;B;C)

One-way ANOVA with $\propto$=0.05 RO=Rank Order #Average of 3 groups

Table 4.49: Rank order of items with the greatest priority for change to implement project management and one-way analysis of variance between means per application group

ITEM CODES	GROUP I $\bar{X}$ RO S N=71	GROUP II $\bar{X}$ RO S N=63	GROUP III $\bar{X}$ RO S N=33	TOTAL# $\bar{X}$ RO S N=167
Q25 FUNCTIONS	2.181 (2) 0.936	2.486 (3) 1.419	2.540 (3) 1.067	2.402 (2) 1.140
Q26 PROCEDURES	2.143 (1) 0.883	2.343 (1) 0.963	2.328 (1) 1.053	2.271 (1) 0.966
Q27 DIRECTION	2.985 (4) 1.206	2.470 (2) 1.144	2.520 (2) 1.152	2.658 (3) 1.167
Q28 ATTITUDES	2.792 (3) 1.135	2.825 (4) 1.184	2.611 (4) 1.146	2.742 (4) 1.155
ONE-WAY ANOVA	**F-value**	**p-value under Ho**	**Tukey's grouping**	
Q25	1.62	0.2013	(1;2;3)	
Q26	0.85	0.4303	(1;2;3)	
Q27	3.66	0.0278*	(1;2;3)	
Q27	0.39	0.6753	(1;2;3)	

One-way ANOVA with $\alpha = 0.05$ RO=Rank Order #Average of 3 groups
*Result statistically significant at 0.05 level

4.5.11 Question 3.11 (Code Q29/Q30/Q31/Q32)

The eleventh question of part C asked respondents to indicate a rank order for different methods which they believed would be the most appropriate for project management to be implemented. The first method was labelled technological, the second, structural, the third, managerial and the final one, the human-oriented method. The results were as indicated in tables 4.50 and 4.51.

Table 4.50: Rank order of methods most appropriate to implement project management and one-way analysis of variance between means per managerial group

ITEM CODES	GROUP A $\bar{X}$ RO S N=23	GROUP B $\bar{X}$ RO S N=97	GROUP C $\bar{X}$ RO S N=45	TOTAL# $\bar{X}$ RO S N=165
Q29 TECHNOLOGIC	3.119 (3) 0.877	3.112 (4) 0.920	3.067 (4) 1.080	3.099 (4) 0.959
Q30 STRUCTURAL	2.071 (2) 1.040	2.038 (1) 1.028	2.163 (1) 1.104	2.091 (1) 1.057
Q31 MANAGERIAL	3.205 (4) 1.846	2.778 (3) 1.327	2.449 (3) 1.026	2.811 (3) 1.400
Q32 HUMAN-ORIENT	1.929 (1) 1.052	2.234 (2) 1.320	2.320 (2) 1.101	2.161 (2) 1.158
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
Q29	0.04	0.9636	(A;B;C)	
Q30	0.22	0.8013	(A;B;C)	
Q31	2.41	0.0928	(A;B)(B;C)	
Q32	0.74	0.4806	(A;B;C)	

One-way ANOVA with $\alpha = 0.05$ RO=Rank Order #Average of 3 groups

Table 4.51: Rank order of methods most appropriate to implement project management and one-way analysis of variance between means per application group

ITEM CODES	GROUP I $\bar{X}$ RO S N=71	GROUP II $\bar{X}$ RO S N=63	GROUP III $\bar{X}$ RO S N=33	TOTAL# $\bar{X}$ RO S N=167
Q29 TECHNOLOGIC	2.902 (3) 1.004	3.146 (4) 0.981	3.308 (4) 0.898	3.118 (4) 0.961
Q30 STRUCTURAL	1.982 (1) 1.015	2.079 (1) 0.985	2.326 (2) 1.163	2.129 (1) 1.054
Q31 MANAGERIAL	3.058 (4) 1.060	2.622 (3) 1.410	2.468 (3) 1.669	2.716 (3) 1.379
Q32 HUMAN-ORIENT	2.127 (2) 1.074	2.402 (2) 1.475	2.134 (1) 1.057	2.221 (2) 1.202
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
Q29	2.17	0.1171	(1;2;3)	
Q30	1.22	0.2990	(1;2;3)	
Q31	2.89	0.0586	(1;2;3)	
Q32	0.93	0.3952	(1;2;3)	

One-way ANOVA with $\alpha = 0.05$ RO=Rank Order

4.5.12 Question 3.12 (Code Q33)

The twelfth question of part C asked respondents to indicate which of two identified change policies would be best suited for implementing project management. The policies dealt with either immediate or gradual implementation. The results were as indicated in tables 4.52 and 4.53.

Table 4.52: Change policies for implementing project management and one-way analysis of variance between means per managerial group

CHANGE POLICIES	GROUP A N c% r%	GROUP B N c% r%	GROUP C N c% r%	TOTAL N %T
GRADUAL (*w1*)	14 61% 15%	56 58% 60%	23 52% 25%	93 57%
IMMEDIATE (*w2*)	9 39% 13%	40 42% 57%	21 48% 30%	70 43%
TOTAL %T	23 14%	96 59%	44 27%	163 100% 100%
$\bar{X}$ S	1.409 0.499	1.426 0.496	1.465 0.505	1.433# 0.500#
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
CODE Q33	0.12	0.8834	(A;B;C)	

χ^2=0.611 p=0.737 C=0.061 N=163 #Average of 3 groups
One-way ANOVA with $\propto$=0.05

Table 4.53: Change policies for implementing project management and one-way analysis of variance between means per application group

CHANGE POLICIES	GROUP I N c% r%	GROUP II N c% r%	GROUP III N c% r%	TOTAL N %T
GRADUAL (*w1*)	35 50% 38%	40 65% 43%	18 55% 19%	93 56%
IMMEDIATE (*w2*)	35 50% 48%	22 35% 31%	15 45% 21%	72 44%
TOTAL %T	70 42%	62 38%	33 20%	165 100% 100%
$\bar{X}$ S	1.500 0.504	1.355 0.482	1.455 0.506	1.437# 0.497#
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
CODE Q33	1.44	0.2411	(1;2;3)	

χ^2=2.872 p=0.238 C=0.131 N=165 #Average of 3 groups
One-way ANOVA with $\propto$=0.05

4.5.13 Question 3.13 (Code Q34/Q35/Q36/Q37)

The thirteenth question of part C asked respondents to indicate a rank order for different strategies which would be the most appropriate for project management to be implemented. The first strategy was labelled facilitative, the second, informational, the third, attitudinal and the final one, political. The results were as indicated in tables 4.54 and 4.55.

Table 4.54: Rank order of strategies most appropriate to implement project management and one-way analysis of variance between means per managerial group

ITEM CODE	GROUP A $\bar{X}$ RO S N=23	GROUP B $\bar{X}$ RO S N=97	GROUP C $\bar{X}$ RO S N=45	TOTAL# $\bar{X}$ RO S N=165
Q34 FACILITATIVE	2.146 (2) 1.944	2.173 (2) 1.351	2.011 (2) 1.100	2.110 (2) 1.465
Q35 INFORMATIONAL	1.715 (1) 0.572	2.122 (1) 1.416	1.905 (1) 0.768	1.914 (1) 0.918
Q36 ATTITUDINAL	2.908 (3) 0.812	2.429 (3) 0.882	2.530 (3) 0.900	2.622 (3) 0.865
Q37 POLITICAL	3.686 (4) 0.701	3.532 (4) 0.867	3.553 (4) 0.837	3.590 (4) 0.802

ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping
Q34	0.20	0.8164	(A;B;C)
Q35	1.20	0.3052	(A;B;C)
Q36	2.50	0.0853	(A;B;C)
Q37	0.29	0.7514	(A;B;C)

One-way ANOVA with $\alpha = 0.05$ RO=Rank Order #Average of 3 groups

Table 4.55: Rank order of strategies most appropriate to implement project management and one-way analysis of variance between means per application group

ITEM CODES	GROUP I $\bar{X}$ RO S N=71	GROUP II $\bar{X}$ RO S N=63	GROUP III $\bar{X}$ RO S N=33	TOTAL# $\bar{X}$ RO S N=167
Q34 FACILTATIVE	1.974 (1) 1.414	2.384 (2) 1.450	1.947 (1) 1.053	2.102 (2) 1.306
Q35 INFORNATIONAL	2.189 (2) 1.545	1.747 (1) 0.768	2.174 (2) 0.867	2.036 (1) 1.060
Q36 ATTITUDINAL	2.585 (3) 0.844	2.484 (3) 0.934	2.379 (3) 0.960	2.483 (3) 0.913
Q37 POLITICAL	3.600 (4) 0.846	3.536 (4) 0.802	3.500 (4) 0.919	3.545 (4) 0.856
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
Q34	1.84	0.1622	(1;2;3)	
Q35	2.63	0.0749	(1;2;3)	
Q36	0.61	0.5465	(1;2;3)	
Q37	0.18	0.8339	(1;2;3)	

One-way ANOVA with $\alpha = 0.05$ RO=Rank Order #Average of 3 groups

4.5.14 Question 3.14 (Code Q38/Q39/Q40)

The fourteenth question of part C asked respondents to indicate a rank order for the activities they regard as the most critical elements for project management to be implemented. The first activity had to do with the feasibility study prior to implementation, the second, the actual implementation, and the final one, supporting the implementation. The results were as indicated in tables 4.56 and 4.57.

Table 4.56: Rank order of activities most critical for implementing project management and one-way analysis of variance between means per managerial group

ITEM CODES	GROUP A $\bar{X}$ RO S N=23	GROUP B $\bar{X}$ RO S N=97	GROUP C $\bar{X}$ RO S N=45	TOTAL# $\bar{X}$ RO S N=165
Q38 FEASIBILITY	3.755 (3) 2.024	3.382 (2) 1.526	3.462 (2) 1.812	3.533 (3) 1.787
Q39 IMPLEMENTING	3.005 (1) 1.235	3.441 (3) 1.377	3.209 (1) 1.319	3.218 (1) 1.310
Q40 SUPPORTING	3.537 (2) 1.322	3.211 (1) 1.069	3.481 (3) 1.817	3.410 (2) 1.403
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
Q38	0.43	0.6484	(A;B;C)	
Q39	1.11	0.3331	(A;B;C)	
Q40	1.25	0.2880	(A;B;C)	

One-way ANOVA with $\alpha = 0.05$ RO=Rank Order #Average of 3 groups

Table 4.57: Rank order of activities most critical for implementing project management and one-way analysis of variance between means per application group

ITEM CODES	GROUP I $\bar{X}$ RO S N=71	GROUP II $\bar{X}$ RO S N=63	GROUP III $\bar{X}$ RO S N=33	TOTAL# $\bar{X}$ RO S N=167
Q38 FEASIBILITY	3.391 (2) 1.711	3.547 (3) 1.740	3.343 (2) 1.549	3.427 (3) 1.667
Q39 IMPLEMENTING	3.465 (3) 1.252	3.303 (2) 1.436	3.000 (1) 1.312	3.256 (1) 1.333
Q40 SUPPORTING	3.285 (1) 1.223	3.255 (1) 0.988	3.657 (3) 1.138	3.399 (2) 1.116
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
Q38	0.21	0.8118	(1;2;3)	
Q39	1.36	0.2600	(1;2;3)	
Q40	1.57	0.2111	(1;2;3)	

One-way ANOVA with $\alpha = 0.05$ RO=Rank Order #Average of 3 groups

4.5.15 Question 3.15 (Code Q41-Q44/Q45-Q48/Q49-Q52)

The fifteenth question of part C asked respondents to indicate a rank order for different people, whom they believed would be the best suited to fulfil certain positions for project management to be implemented. The first category was top-level managers, the second, middle managers, the third, functional managers and the final one, project managers. The positions listed were first, the change manager, second, the change agent, and lastly, the change target. The results were as indicated in tables 4.58 to 4.63.

Table 4.58: Rank order of persons best suited to fulfil the position of change manager and one-way analysis of variance between means per managerial group

ITEM CODES	GROUP A $\bar{X}$ RO S N=11	GROUP B $\bar{X}$ RO S N=56	GROUP C $\bar{X}$ RO S N=24	TOTAL# $\bar{X}$ RO S N=91
Q41 TOP-LEVEL	1.818 (1) 1.250	1.796 (1) 1.171	2.174 (2) 1.424	1.929 (1) 1.282
Q42 MIDDLE MGMT	2.182 (2) 0.603	2.259 (2) 0.726	2.130 (1) 0.762	2.190 (2) 0.697
Q43 FUNCTIONAL	3.000 (3) 0.775	2.926 (3) 0.999	2.957 (4) 0.776	2.961 (4) 0.850
Q44 PROJECT MGMT	3.000 (3) 1.183	3.019 (4) 1.079	2.739 (3) 1.179	2.919 (3) 1.147

ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping
Q41	0.75	0.4777	(A;B;C)
Q42	0.27	0.7649	(A;B;C)
Q43	0.03	0.9680	(A;B;C)
Q44	0.53	0.5881	(A;B;C)

One-way ANOVA with $\alpha = 0.05$ RO=Rank Order #Average of 3 groups

Table 4.59: Rank order of persons best suited to fulfil the position of change manager and one-way analysis of variance between means per application group

ITEM CODES	GROUP I $\bar{X}$ RO S N=39	GROUP II $\bar{X}$ RO S N=34	GROUP III $\bar{X}$ RO S N=19	TOTAL# $\bar{X}$ RO S N=92
Q41 TOP-LEVEL	1.359 (1) 0.873	2.294 (2) 1.292	2.167 (2) 1.505	1.940 (1) 1.223
Q42 MIDDLE MGMT	2.359 (2) 0.668	2.147 (1) 0.744	2.111 (1) 0.832	2.206 (2) 0.748
Q43 FUNCTIONAL	3.051 (3) 0.724	2.852 (4) 1.105	2.833 (3) 0.857	2.912 (3) 0.895
Q44 PROJECT MGMT	3.231 (4) 1.012	2.706 (3) 1.169	2.889 (4) 1.023	2.942 (4) 1.068

ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping
Q41	6.42	0.0025*	(1)(2;3)
Q42	1.06	0.3495	(1;2;3)
Q43	0.57	0.5673	(1;2;3)
Q44	2.22	0.1143	(1;2;3)

One-way ANOVA with $\alpha = 0.05$ RO=Rank Order #Average of 3 groups
*Result statistically significant at 0.05 level

Table 4.60: Rank order of persons best suited to fulfil the position of change agent and one-way analysis of variance between means per managerial group

ITEM CODES	GROUP A $\bar{X}$ RO S N=11	GROUP B $\bar{X}$ RO S N=56	GROUP C $\bar{X}$ RO S N=24	TOTAL# $\bar{X}$ RO S N=91
Q45 TOP-LEVEL	3.273 (4) 1.104	2.870 (4) 1.182	2.955 (4) 1.128	3.033 (4) 1.138
Q46 MIDDLE MGMT	2.000 (1) 0.894	2.204 (1) 0.974	1.773 (1) 0.887	1.992 (1) 0.918
Q47 FUNCTIONAL	2.273 (2) 1.001	2.704 (3) 1.018	2.682 (3) 0.982	2.553 (3) 1.000
Q48 PROJECT MGMT	2.455 (3) 1.214	2.222 (2) 1.160	2.591 (2) 1.201	2.423 (2) 1.192

ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping
Q45	0.54	0.5843	(A;B;C)
Q46	1.67	0.1948	(A;B;C)
Q47	0.85	0.4320	(A;B;C)
Q48	0.84	0.4339	(A;B;C)

One-way ANOVA with $\alpha = 0.05$ RO=Rank Order #Average of 3 groups

Table 4.61: Rank order of persons best suited to fulfil the position of change agent and one-way analysis of variance between means per application group

ITEM CODES	GROUP I $\bar{X}$ S N=39 RO	GROUP II $\bar{X}$ S N=34 RO	GROUP III $\bar{X}$ S N=19 RO	TOTAL# $\bar{X}$ S N=92 RO
Q45 TOP-LEVEL	2.421 1.130 (2)	3.273 1.039 (4)	3.316 1.057 (4)	3.003 1.075 (4)
Q46 MIDDLE MGMT	2.053 1.114 (1)	2.091 0.914 (1)	2.211 0.855 (2)	2.118 0.961 (1)
Q47 FUNCTIONAL	2.790 0.905 (4)	2.515 1.064 (3)	2.579 1.071 (3)	2.628 1.013 (3)
Q48 PROJECT MGMT	2.737 1.201 (3)	2.121 1.083 (2)	1.895 1.049 (1)	2.251 1.111 (2)
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
Q45	7.06	0.0014*	(1)(2;3)	
Q46	0.16	0.8504	(1;2;3)	
Q47	0.71	0.4922	(1;2;3)	
Q48	4.45	0.0144*	(1;2)(2;3)	

One-way ANOVA with $\alpha = 0.05$ RO=Rank Order #Average of 3 groups
*Result statistically significant at 0.05 level

Table 4.62: Rank order of persons best suited to fulfil the position of change target and one-way analysis of variance between means per managerial group

ITEM CODES	GROUP A $\bar{X}$ RO S N=11	GROUP B $\bar{X}$ RO S N=56	GROUP C $\bar{X}$ RO S N=24	TOTAL# $\bar{X}$ RO S N=91
Q49 TOP-LEVEL	3.182 (4) 1.250	3.315 (4) 1.104	3.095 (3) 1.272	3.197 (4) 1.208
Q50 MIDDLE MGMT	2.546 (3) 0.522	2.463 (3) 0.761	2.333 (2) 0.894	2.447 (3) 0.726
Q51 FUNCTIONAL	2.000 (1) 1.183	2.074 (1) 1.032	2.333 (2) 1.002	2.134 (1) 1.072
Q52 PROJECT MGMT	2.273 (2) 1.191	2.148 (2) 1.166	2.238 (1) 1.211	2.219 (2) 1.189

ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping
Q49	0.30	0.7405	(A;B;C)
Q50	0.32	0.7285	(A;B;C)
Q51	0.57	0.5654	(A;B;C)
Q52	0.08	0.9233	(A;B;C)

One-way ANOVA with $\alpha = 0.05$ RO=Rank Order #Average of 3 groups

Table 4.63: Rank order of persons best suited to fulfil the position of change target and one-way analysis of variance between means per application group

ITEM CODES	GROUP I $\bar{X}$ S RO N=39	GROUP II $\bar{X}$ S RO N=34	GROUP III $\bar{X}$ S RO N=19	TOTAL# $\bar{X}$ S RO N=92
Q49 TOP-LEVEL	3.378 1.063 (4)	3.303 1.015 (4)	2.737 1.408 (3)	3.139 1.162 (4)
Q50 MIDDLE MGMT	2.757 0.683 (3)	2.424 0.830 (3)	2.000 0.667 (1)	2.394 0.726 (3)
Q51 FUNCTIONAL	1.946 0.880 (2)	2.242 1.119 (2)	2.368 1.116 (2)	2.185 1.038 (1)
Q52 PROJECT MGMT	1.919 1.115 (1)	2.030 1.104 (1)	2.895 1.049 (4)	2.281 1.089 (2)

ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping
Q49	2.20	0.1173	(1;2;3)
Q50	6.70	0.0020*	(1;2)(2;3)
Q51	1.30	0.2784	(1;2;3)
Q52	5.38	0.0063*	(1;2)(3)

One-way ANOVA with $\alpha = 0.05$ RO=Rank Order #Average of 3 groups
*Result statistically significant at 0.05 level

4.5.16 Question 3.16 (Code Q53/Q54/Q55)

The sixteenth question of part C asked respondents to indicate a rank order for sources of resistance they believed were the greatest barriers to project management being implemented. The first source of resistance was barriers to acceptance, second, barriers to acting, and the final one, barriers to understanding. The results were as indicated in tables 4.64 and 4.65.

Table 4.64: Rank order of sources of greatest resistance for implementing project management and one-way analysis of variance between means per managerial group

ITEM CODES	GROUP A $\bar{X}$ RO S N=23	GROUP B $\bar{X}$ RO S N=97	GROUP C $\bar{X}$ RO S N=45	TOTAL# $\bar{X}$ RO S N=165
Q53 ACCEPTANCE	2.202 (3) 0.906	2.125 (3) 0.855	2.233 (3) 0.794	2.187 (3) 0.852
Q54 ACTING	2.114 (2) 1.171	1.983 (2) 0.940	1.852 (1) 0.879	1.983 (2) 0.997
Q55 UNDERSTAND	1.869 (1) 0.687	1.937 (1) 0.696	1.915 (2) 0.689	1.907 (1) 0.691
ONE-WAY ANOVA	**F-value**	**p-value under Ho**	**Tukey's grouping**	
Q53	0.26	0.7703	(A;B;C)	
Q54	0.58	0.5587	(A;B;C)	
Q55	0.09	0.9179	(A;B;C)	

One-way ANOVA with $\alpha = 0.05$ RO=Rank Order #Average of 3 groups

Table 4.65: Rank order of sources of greatest resistance for implementing project management and one-way analysis of variance between means per application group

ITEM CODES	GROUP I $\bar{X}$ RO S N=71	GROUP II $\bar{X}$ RO S N=63	GROUP III $\bar{X}$ RO S N=33	TOTAL# $\bar{X}$ RO S N=167
Q53 ACCEPTANCE	2.221 (3) 0.889	2.232 (3) 0.779	2.006 (2) 0.873	2.153 (3) 0.847
Q54 ACTING	1.921 (2) 0.984	2.025 (2) 0.968	1.919 (1) 0.860	1.955 (2) 0.937
Q55 UNDERSTAND	1.917 (1) 0.613	1.810 (1) 0.746	2.075 (3) 0.672	1.934 (1) 0.677
ONE-WAY ANOVA	**F-value**	**p-value under Ho**	**Tukey's grouping**	
Q53	0.87	0.4217	(1;2;3)	
Q54	0.23	0.7977	(1;2;3)	
Q55	1.61	0.2028	(1;2;3)	

One-way ANOVA with $\alpha = 0.05$ RO=Rank Order #Average of 3 groups

4.5.17 Question 3.17 (Code Q56)

The seventeenth question in part C of the questionnaire asked respondents to indicate whether project management as a formal policy, could easily fit in with the "way things were done" in their department and the "way people thought and acted". The results were as indicated in tables 4.66 and 4.67.

Table 4.66: "Easy fit" for project management in department and one-way analysis of variance between means per managerial group

EASY FIT FOR PROJECT MANAGEMENT	GROUP A N c% r%	GROUP B N c% r%	GROUP C N c% r%	TOTAL N %T
YES (*w1*)	19 83% 18%	57 61% 53%	31 69% 29%	107 66%
NO (*w2*)	4 17% 7%	37 39% 67%	14 31% 26%	55 34%
TOTAL %T	23 14%	94 58%	45 28%	162 100% 100%
$\bar{X}$ S	1.182 0.388	1.391 0.491	1.318 0.468	1.297# 0.449#
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
CODE Q56	1.81	0.1664	(A;B;C)	

χ^2=4.202 p=0.122 C=0.159 N=162 #Average of 3 groups
One-way ANOVA with α=0.05

Table 4.67: "Easy fit" for project management in department and one-way analysis of variance between means per application group

EASY FIT FOR PROJECT MANAGEMENT	GROUP I N c% r%	GROUP II N c% r%	GROUP III N c% r%	TOTAL N %T
YES (*w1*)	54 77% 51%	36 60% 34%	16 48% 15%	106 65%
NO (*w2*)	16 23% 28%	24 40% 42%	17 52% 30%	57 35%
TOTAL %T	70 43%	60 37%	33 20%	163 100% 100%
$\bar{X}$ S	1.229 0.423	1.400 0.494	1.515 0.508	1.381# 0.475#
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
CODE Q56	4.76	0.0098**	(1;2)(2;3)	

χ^2=9.156 p=0.010* C=0.231 N=163 #Average of 3 groups
*Results statistically significant at a 0.025 level where χ^2=7.378 for 2 degrees of freedom
One-way ANOVA with $\propto$=0.05
**Result statistically significant at 0.05 level

4.5.18 Question 3.18 (Code Q57)

The eighteenth question in part C of the questionnaire asked respondents to indicate whether the existing organizational structure would have to be changed in order to accommodate implementing project management. The results were as indicated in tables 4.68 and 4.69.

Table 4.68: Change of organizational structure to implement project management and one-way analysis of variance between means per managerial group

CHANGE STRUCTURE	GROUP A N c% r%	GROUP B N c% r%	GROUP C N c% r%	TOTAL N %T
YES (*w1*)	12 52% 11%	71 73% 64%	28 62% 25%	111 67%
NO (*w2*)	11 48% 20%	26 27% 48%	17 38% 32%	54 33%
TOTAL %T	23 14%	97 59%	45 27%	165 100% 100%
$\bar{X}$ S	1.455 0.511	1.263 0.445	1.364 0.490	1.361# 0.482#
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
CODE Q57	1.83	0.1644	(A;B;C)	

χ^2=4.449 p=0.108 C=0.162 N=165 #Average of 3 groups
One-way ANOVA with α=0.05

Table 4.69: Change of organizational structure to implement project management and one-way analysis of variance between means per application group

CHANGE STRUCTURE	GROUP I N c% r%	GROUP II N c% r%	GROUP III N c% r%	TOTAL N %T
YES (*w1*)	43 61% 38%	46 73% 40%	25 76% 22%	114 68%
NO (*w2*)	28 39% 53%	17 27% 32%	8 24% 15%	53 32%
TOTAL %T	71 42%	63 38%	33 20%	167 100% 100%
$\bar{X}$ S	1.394 0.492	1.270 0.447	1.242 0.435	1.302# 0.458#
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
CODE Q57	1.73	0.1801	(1;2;3)	

χ^2=3.455 p=0.178 C=0.142 N=167 #Average of 3 groups
One-way ANOVA with α=0.05

4.5.19 Question 3.19 (Code Q58/Q59/Q60)

The nineteenth question of part C asked respondents to indicate a rank order for the best means to ensure that once project management was implemented, it would remain effectively and efficiently applied. The first way was the departmental structure, second, support for management, and the final one, the positive actions of personnel. The results were as indicated in tables 4.70 and 4.71.

Table 4.70: Rank order of best means to ensure the continued application of project management and one-way analysis of variance between means per managerial group

ITEM CODES	GROUP A $\bar{X}$ RO S N=23	GROUP B $\bar{X}$ RO S N=97	GROUP C $\bar{X}$ RO S N=45	TOTAL# $\bar{X}$ RO S N=165
Q58 STRUCTURE	2.619 (3) 0.581	2.070 (3) 0.898	2.046 (3) 0.889	2.245 (3) 0.789
Q59 SUPPORT MGMT	1.864 (2) 1.072	1.933 (1) 0.750	1.921 (1) 0.735	1.906 (1) 0.852
Q60 PERSONNEL	1.714 (1) 0.883	2.039 (2) 0.888	2.034 (2) 0.801	1.929 (2) 0.857
ONE-WAY ANOVA	**F-value**	**p-value under Ho**	**Tukey's grouping**	
Q58	3.83	0.0238*	(A)(B;C)	
Q59	0.07	0.9356	(A;B;C)	
Q60	1.27	0.2850	(A;B;C)	

One-way ANOVA with $\alpha = 0.05$ RO=Rank Order #Average of 3 groups
*Result statistically significant at 0.05 level

Table 4.71: Rank order of best means to ensure the continued application of project management and one-way analysis of variance between means per application group

ITEM CODES	GROUP I $\bar{X}$ RO S N=71	GROUP II $\bar{X}$ RO S N=63	GROUP III $\bar{X}$ RO S N=33	TOTAL# $\bar{X}$ RO S N=167
Q58 STRUCTURE	2.151 (3) 0.884	2.171 (3) 0.899	2.030 (2) 0.847	2.117 (3) 0.876
Q59 SUPPORT MGMT	1.881 (1) 0.711	1.995 (2) 0.897	1.909 (1) 0.765	1.928 (1) 0.791
Q60 PERSONNEL	2.034 (2) 0.955	1.898 (1) 0.802	2.061 (3) 0.827	1.998 (2) 0.861
ONE-WAY ANOVA	**F-value**	**p-value under Ho**	**Tukey's grouping**	
Q58	0.30	0.7443	(1;2;3)	
Q59	0.35	0.7035	(1;2;3)	
Q60	0.50	0.6096	(1;2;3)	

One-way ANOVA with $\alpha = 0.05$ RO=Rank Order #Average of 3 groups

4.5.20 Question 3.20 (Code Q61/Q62/Q63)

The twentieth question of part C asked respondents to indicate a rank order for the most effective managerial assignment position to oversee the implementation of project management. The first position was managers from outside the department, second, managers within the department, and the final one, managers from both outside and within the department. The results were as indicated in tables 4.72 and 4.73.

Table 4.72: Rank order of most effective managerial assignment position for project management implementation and one-way analysis of variance between means per managerial group

ITEM CODES	GROUP A $\bar{X}$ RO S N=23	GROUP B $\bar{X}$ RO S N=97	GROUP C $\bar{X}$ RO S N=45	TOTAL# $\bar{X}$ RO S N=165
Q61 OUTSIDE MGMT	2.736 (3) 0.995	2.578 (3) 0.642	2.636 (3) 0.712	2.650 (3) 0.783
Q62 INSIDE MGMT	1.543 (1) 0.689	1.774 (1) 1.079	1.460 (1) 0.707	1.592 (1) 0.825
Q63 BOTH MGMT	1.876 (2) 0.675	1.786 (2) 0.674	1.904 (2) 0.614	1.855 (2) 0.654
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
Q61	0.46	0.6321	(A;B;C)	
Q62	1.84	0.1619	(A;B;C)	
Q63	0.53	0.5895	(A;B;C)	

One-way ANOVA with $\alpha = 0.05$ RO=Rank Order #Average of 3 groups

Table 4.73: Rank order of most effective managerial assignment position for project management implementation and one-way analysis of variance between means per application group

ITEM CODES	GROUP I $\bar{X}$ RO S N=71	GROUP II $\bar{X}$ RO S N=63	GROUP III $\bar{X}$ RO S N=33	TOTAL# $\bar{X}$ RO S N=167
Q61 OUTSIDE MGMT	2.646 (3) 0.607	2.625 (3) 0.807	2.546 (3) 0.711	2.605 (3) 0.708
Q62 INSIDE MGMT	1.678 (1) 1.044	1.663 (1) 0.925	1.576 (1) 0.751	1.639 (1) 0.907
Q63 BOTH MGMT	1.802 (2) 0.648	1.838 (2) 0.641	1.879 (2) 0.696	1.839 (2) 0.662
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
Q61	0.23	0.7963	(1;2;3)	
Q62	0.14	0.8722	(1;2;3)	
Q63	0.16	0.8537	(1;2;3)	

One-way ANOVA with $\alpha = 0.05$ RO=Rank Order #Average of 3 groups

4.6 FORCE FIELD ANALYSIS OF PROJECT MANAGEMENT

4.6.1 Question 4.1 (Code P1-P14/S1-S9/O1-O8/J1-J10/H1-H6)

The first question in part D of the questionnaire asked respondents to indicate the relative importance of the factors which they believed would contribute to the implementation of project management. The different factors were classified into five main categories: philosophical (P1-P14), situational (S1-S9), organizational (O1-O8), job-dimensional (J1-J10) and human-oriented factors (H1-H6). The results of the one-way analysis of variance between the means of the different groups were as indicated in tables 4.74 to 4.83. The results of the factor analysis within the five main categories were as indicated in tables 4.84 to 4.88. Note that the item codes used refer to the factors identified in the questionnaire (attached in Annexure B).

Table 4.74: Rank order of philosophical factors according to relative importance for contributing to the implementation of project management and one-way analysis of variance between means per managerial group

ITEM CODE	GROUP A $\bar{X}$ RO S N=23	GROUP B $\bar{X}$ RO S N=97	GROUP C $\bar{X}$ RO S N=45	TOTAL# $\bar{X}$ RO S N=165	F-value	p-value	Tukey's grouping
P1	1.500 (4) 0.730	1.368 (2) 0.583	1.296 (2) 0.506	1.388 (2) 0.606	0.89	0.4141	(A;B;C)
P2	2.333 (11) 1.041	1.968 (12) 0.989	1.818 (10) 0.834	2.040 (12) 0.955	2.09	0.1272	(A;B;C)
P3	1.682 (7) 0.714	1.568 (7) 0.749	1.682 (8) 0.889	1.644 (7) 0.784	0.42	0.6561	(A;B;C)
P4	1.455 (3) 0.590	1.351 (1) 0.577	1.432 (3) 0.583	1.413 (3) 0.583	0.45	0.6362	(A;B;C)
P5	1.636 (6) 0.902	1.632 (8) 0.782	1.727 (9) 0.773	1.665 (8) 0.819	0.23	0.7968	(A;B;C)
P6	1.524 (5) 0.680	1.505 (5) 0.752	1.455 (4) 0.659	1.495 (5) 0.697	0.10	0.9093	(A;B;C)
P7	1.500 (4) 0.665	1.558 (6) 0.677	1.591 (7) 0.723	1.550 (6) 0.688	0.13	0.8808	(A;B;C)
P8	1.773 (8) 0.864	1.726 (9) 0.907	1.818 (10) 1.014	1.772 (9) 0.928	0.15	0.8595	(A;B;C)
P9	1.182 (1) 0.388	1.368 (2) 0.651	1.273 (1) 0.506	1.274 (1) 0.515	1.08	0.3422	(A;B;C)
P10	1.500 (4) 0.730	1.463 (3) 0.595	1.523 (5) 0.757	1.495 (5) 0.694	0.13	0.8807	(A;B;C)
P11	1.773 (8) 0.689	1.819 (10) 0.749	2.046 (12) 0.812	1.879 (10) 0.750	1.58	0.2099	(A;B;C)
P12	2.091 (9) 0.878	1.853 (11) 0.755	1.886 (11) 0.842	1.943 (11) 0.825	0.80	0.4499	(A;B;C)
P13	1.409 (2) 0.656	1.484 (4) 0.614	1.568 (6) 0.723	1.487 (4) 0.664	0.48	0.6223	(A;B;C)
P14	2.182 (10) 0.887	2.076 (13) 0.820	2.095 (13) 0.763	2.118 (13) 0.823	0.15	0.8610	(A;B;C)

One-way ANOVA with $\alpha = 0.05$ RO=Rank Order #Average of 3 groups

Table 4.75: Rank order of philosophical factors according to relative importance for contributing to the implementation of project management and one-way analysis of variance between means per application group

ITEM CODE	GROUP I $\bar{X}$ RO S N=71	GROUP II $\bar{X}$ RO S N=63	GROUP III $\bar{X}$ RO S N=33	TOTAL# $\bar{X}$ RO S N=167	F-value	p-value	Tukey's grouping
P1	1.352 (3) 0.537	1.413 (1) 0.687	1.303 (2) 0.529	1.356 (2) 0.584	0.40	0.6740	(1;2;3)
P2	1.757 (11) 0.842	2.143 (12) 0.998	2.182 (8) 1.014	2.027 (13) 0.951	3.68	0.0273*	(1;2;3)
P3	1.563 (8) 0.788	1.651 (6) 0.722	1.546 (4) 0.794	1.587 (8) 0.768	0.30	0.7436	(1;2;3)
P4	1.338 (2) 0.559	1.500 (3) 0.621	1.242 (1) 0.502	1.360 (3) 0.561	2.50	0.0849	(1;2;3)
P5	1.592 (9) 0.709	1.778 (9) 0.812	1.636 (5) 0.994	1.669 (9) 0.838	0.92	0.4012	(1;2;3)
P6	1.386 (4) 0.621	1.571 (5) 0.665	1.546 (4) 0.938	1.501 (6) 0.741	1.27	0.2839	(1;2;3)
P7	1.437 (7) 0.603	1.667 (7) 0.672	1.636 (5) 0.859	1.580 (7) 0.711	2.12	0.1239	(1;2;3)
P8	1.662 (10) 0.844	1.921 (10) 0.938	1.697 (6) 1.015	1.760 (10) 0.932	1.45	0.2374	(1;2;3)
P9	1.225 (1) 0.453	1.444 (2) 0.713	1.303 (2) 0.585	1.324 (1) 0.584	2.33	0.1002	(1;2;3)
P10	1.394 (5) 0.573	1.683 (8) 0.758	1.303 (2) 0.529	1.460 (4) 0.620	5.02	0.0077*	(1;2)(1;3)
P11	1.871 (12) 0.741	1.968 (11) 0.782	1.697 (6) 0.728	1.845 (11) 0.750	1.40	0.2493	(1;2;3)
P12	1.944 (13) 0.876	1.968 (11) 0.740	1.636 (5) 0.699	1.849 (12) 0.772	2.15	0.1195	(1;2;3)
P13	1.423 (6) 0.577	1.556 (4) 0.713	1.485 (3) 0.667	1.488 (5) 0.652	0.70	0.4977	(1;2;3)
P14	2.000 (14) 0.780	2.237 (13) 0.795	2.061 (7) 0.864	2.099 (14) 0.813	1.44	0.2390	(1;2;3)

One-way ANOVA with $\alpha = 0.05$ RO=Rank Order #Average of 3 groups
*Result statistically significant at 0.05 level

Table 4.76: Rank order of situational factors according to relative importance for contributing to the implementation of project management and one-way analysis of variance between means per managerial group

ITEM CODE	GROUP A $\bar{X}$ S RO N=23	GROUP B $\bar{X}$ S RO N=97	GROUP C $\bar{X}$ S RO N=45	TOTAL# $\bar{X}$ S RO N=165	F-value	p-value	Tukey's grouping
S1	1.227 (1) 0.422	1.190 (1) 0.492	1.296 (1) 0.661	1.238 (1) 0.525	0.59	0.5580	(A;B;C)
S2	2.095 (6) 0.921	2.236 (9) 1.055	2.233 (7) 1.123	2.188 (7) 1.033	0.16	0.8554	(A;B;C)
S3	2.524 (9) 1.058	2.191 (7) 1.053	2.163 (6) 0.971	2.293 (8) 1.027	1.00	0.3708	(A;B;C)
S4	1.955 (5) 0.733	1.884 (5) 0.869	1.698 (4) 0.758	1.846 (5) 0.787	1.00	0.3713	(A;B;C)
S5	2.500 (8) 0.790	2.192 (8) 0.918	2.296 (8) 0.905	2.329 (9) 0.871	1.11	0.3337	(A;B;C)
S6	1.364 (2) 0.583	1.674 (3) 0.800	1.705 (5) 0.787	1.581 (3) 0.723	1.64	0.1978	(A;B;C)
S7	1.682 (4) 0.765	1.705 (4) 0.724	1.614 (3) 0.684	1.667 (4) 0.724	0.24	0.7861	(A;B;C)
S8	1.636 (3) 0.722	1.579 (2) 0.703	1.386 (2) 0.614	1.534 (2) 0.680	1.46	0.2350	(A;B;C)
S9	2.182 (7) 1.072	2.063 (6) 0.977	2.296 (8) 1.022	2.180 (6) 1.024	0.82	0.4423	(A;B;C)

One-way ANOVA with $\alpha = 0.05$ RO=Rank Order #Average of 3 groups

Table 4.77: Rank order of situational factors according to relative importance for contributing to the implementation of project management and one-way analysis of variance between means per application group

ITEM CODE	GROUP I $\bar{X}$ S RO N=71	GROUP II $\bar{X}$ S RO N=63	GROUP III $\bar{X}$ S RO N=33	TOTAL# $\bar{X}$ S RO N=167	F-value	p-value	Tukey's grouping
S1	1.197 (1) 0.524	1.254 (1) 0.595	1.182 (1) 0.392	1.211 (1) 0.504	0.27	0.7600	(1;2;3)
S2	2.063 (6) 1.001	2.333 (9) 1.078	2.375 (7) 1.100	2.257 (7) 1.060	1.41	0.2464	(1;2;3)
S3	2.172 (9) 1.047	2.175 (6) 0.976	2.625 (9) 1.129	2.324 (9) 1.051	2.43	0.0917	(1;2;3)
S4	1.857 (5) 0.839	1.952 (4) 0.792	1.727 (5) 0.839	1.845 (5) 0.823	0.82	0.4410	(1;2;3)
S5	2.169 (8) 0.862	2.290 (8) 0.816	2.394 (8) 1.059	2.284 (8) 0.912	0.78	0.4585	(1;2;3)
S6	1.563 (4) 0.649	1.746 (3) 0.803	1.636 (4) 0.962	1.648 (3) 0.805	0.93	0.3983	(1;2;3)
S7	1.465 (3) 0.629	1.984 (5) 0.707	1.546 (3) 0.754	1.665 (4) 0.697	10.36	0.0001*	(1;3)(2)
S8	1.394 (2) 0.573	1.714 (2) 0.682	1.515 (2) 0.834	1.541 (2) 0.696	3.81	0.0242*	(1;3)(2;3)
S9	2.129 (7) 1.020	2.238 (7) 0.962	2.030 (6) 1.075	2.132 (6) 1.019	0.49	0.6152	(1;2;3)

One-way ANOVA with $\alpha = 0.05$ RO=Rank Order #Average of 3 groups
*Result statistically significant at 0.05 level

Table 4.78: Rank order of organizational factors according to relative importance for contributing to the implementation of project management and one-way analysis of variance between means per managerial group

ITEM CODE	GROUP A $\bar{X}$ S RO N=23	GROUP B $\bar{X}$ S RO N=97	GROUP C $\bar{X}$ S RO N=45	TOTAL# $\bar{X}$ S RO N=165	F-value	p-value	Tukey's grouping
O1	2.364 (4) 0.974	1.840 (4) 0.910	1.591 (1) 0.654	1.932 (3) 0.846	6.01	0.0030*	(A)(B;C)
O2	2.227 (3) 0.850	1.564 (2) 0.778	1.750 (3) 0.894	1.847 (2) 0.841	6.18	0.0026*	(A)(B;C)
O3	2.429 (5) 0.953	2.132 (6) 0.792	2.333 (5) 0.846	2.298 (5) 0.864	1.61	0.2033	(A;B;C)
O4	2.046 (2) 0.853	1.832 (3) 0.731	2.140 (4) 0.765	2.006 (4) 0.783	2.70	0.0706	(A;B;C)
O5	2.682 (6) 0.982	2.330 (8) 1.092	2.364 (6) 1.053	2.459 (7) 1.042	0.98	0.3776	(A;B;C)
O6	2.727 (8) 1.137	1.989 (5) 0.857	2.381 (7) 0.728	2.366 (6) 0.907	7.50	0.0008*	(A;C)(B;C)
O7	1.952 (1) 1.019	1.547 (1) 0.692	1.744 (2) 0.859	1.748 (1) 0.857	2.72	0.0691	(A;B;C)
O8	2.700 (7) 0.966	2.277 (7) 0.919	2.405 (8) 0.979	2.461 (8) 0.955	1.70	0.1863	(A;B;C)

One-way ANOVA with $\alpha = 0.05$ RO=Rank Order #Average of 3 groups
*Result statistically significant at 0.05 level

Table 4.79: Rank order of organizational factors according to relative importance for contributing to the implementation of project management and one-way analysis of variance between means per application group

ITEM CODE	GROUP I $\bar{X}$ RO S N=71	GROUP II $\bar{X}$ RO S N=63	GROUP III $\bar{X}$ RO S N=33	TOTAL# $\bar{X}$ RO S N=167	F-value	p-value	Tukey's grouping
O1	1.958 (4) 0.963	1.810 (2) 0.780	1.719 (3) 0.851	1.829 (3) 0.865	0.96	0.3849	(1;2;3)
O2	1.688 (2) 0.724	1.841 (3) 0.846	1.688 (2) 0.965	1.739 (2) 0.845	1.24	0.2924	(1;2;3)
O3	2.118 (5) 0.744	2.288 (6) 0.832	2.303 (7) 1.015	2.236 (6) 0.864	0.86	0.4230	(1;2;3)
O4	1.857 (3) 0.767	2.000 (4) 0.783	1.970 (4) 0.770	1.942 (4) 0.773	0.61	0.5446	(1;2;3)
O5	2.386 (7) 1.107	2.444 (8) 0.980	2.212 (5) 1.193	2.347 (7) 1.093	0.51	0.6014	(1;2;3)
O6	2.232 (6) 0.926	2.213 (5) 0.897	2.242 (6) 0.969	2.229 (5) 0.931	0.01	0.9876	(1;2;3)
O7	1.681 (1) 0.831	1.730 (1) 0.745	1.515 (1) 0.755	1.642 (1) 0.777	0.83	0.4361	(1;2;3)
O8	2.397 (8) 0.917	2.397 (7) 0.943	2.323 (8) 1.045	2.372 (8) 0.968	0.08	0.9264	(1;2;3)

One-way ANOVA with $\alpha = 0.05$ RO=Rank Order #Average of 3 groups

Table 4.80: Rank order of job-dimensional factors according to relative importance for contributing to the implementation of project management and one-way analysis of variance between means per managerial group

ITEM CODE	GROUP A $\bar{X}$ RO S N=23	GROUP B $\bar{X}$ RO S N=97	GROUP C $\bar{X}$ RO S N=45	TOTAL# $\bar{X}$ RO S N=165	F-value	p-value	Tukey's grouping
J1	1.682 (4) 0.714	1.221 (1) 0.468	1.364 (2) 0.529	1.422 (3) 0.570	7.10	0.0011*	(A)(B;C)
J2	1.955 (5) 0.878	1.642 (6) 0.865	1.705 (7) 0.895	1.767 (6) 0.879	1.13	0.3256	(A;B;C)
J3	1.636 (3) 0.656	1.516 (4) 0.694	1.523 (4) 0.757	1.558 (4) 0.702	0.26	0.7676	(A;B;C)
J4	1.500 (2) 0.665	1.611 (5) 0.758	1.614 (5) 0.650	1.575 (5) 0.691	0.23	0.7977	(A;B;C)
J5	2.182 (6) 0.834	2.075 (9) 0.871	2.114 (9) 0.804	2.124 (8) 0.836	0.15	0.8651	(A;B;C)
J6	1.636 (3) 0.656	1.516 (4) 0.751	1.523 (4) 0.589	1.558 (4) 0.665	0.28	0.7570	(A;B;C)
J7	2.182 (6) 0.968	1.737 (7) 0.916	1.636 (6) 0.806	1.852 (7) 0.897	2.90	0.0579	(A;B)(B;C)
J8	1.318 (1) 0.559	1.284 (2) 0.520	1.409 (3) 0.539	1.337 (2) 0.539	0.83	0.4383	(A;B;C)
J9	1.318 (1) 0.559	1.295 (3) 0.524	1.341 (1) 0.603	1.318 (1) 0.562	0.11	0.8986	(A;B;C)
J10	2.636 (7) 1.118	1.842 (8) 1.058	2.000 (8) 0.965	2.159 (9) 1.047	5.13	0.0070*	(A)(B;C)

One-way ANOVA with $\propto = 0.05$ RO=Rank Order #Average of 3 groups
*Result statistically significant at 0.05 level

Table 4.81: Rank order of job-dimensional factors according to relative importance for contributing to the implementation of project management and one-way analysis of variance between means per application group

ITEM CODE	GROUP I $\bar{X}$ RO S N=71	GROUP II $\bar{X}$ RO S N=63	GROUP III $\bar{X}$ RO S N=33	TOTAL# $\bar{X}$ RO S N=167	F-value	p-value	Tukey's grouping
J1	1.225 (2) 0.421	1.429 (2) 0.588	1.303 (2) 0.637	1.319 (2) 0.549	2.43	0.0911	(1;2;3)
J2	1.549 (6) 0.807	1.921 (7) 0.989	1.576 (5) 0.663	1.682 (7) 0.820	3.54	0.0314*	(1;2;3)
J3	1.479 (4) 0.652	1.651 (3) 0.765	1.394 (4) 0.659	1.508 (4) 0.692	1.76	0.1755	(1;2;3)
J4	1.493 (5) 0.582	1.698 (4) 0.733	1.667 (6) 0.990	1.619 (6) 0.768	1.45	0.2366	(1;2;3)
J5	2.000 (9) 0.862	2.145 (8) 0.743	2.313 (9) 1.030	2.153 (10) 0.878	1.53	0.2191	(1;2;3)
J6	1.479 (4) 0.606	1.714 (5) 0.792	1.364 (3) 0.603	1.519 (5) 0.667	3.44	0.0342*	(1;2)(1;3)
J7	1.690 (7) 0.855	1.905 (6) 0.893	1.697 (7) 1.015	1.764 (8) 0.921	1.09	0.3394	(1;2;3)
J8	1.296 (3) 0.518	1.397 (1) 0.555	1.273 (1) 0.574	1.322 (3) 0.549	0.80	0.4508	(1;2;3)
J9	1.183 (1) 0.425	1.397 (1) 0.525	1.364 (3) 0.742	1.315 (1) 0.564	2.94	0.0559	(1;2;3)
J10	1.817 (8) 1.060	2.238 (9) 1.043	1.818 (8) 1.074	1.958 (9) 1.059	3.11	0.0471*	(1;2;3)

One-way ANOVA with $\alpha = 0.05$ RO=Rank Order #Average of 3 groups
*Result statistically significant at 0.05 level

Table 4.82: Rank order of human-oriented factors according to relative importance for contributing to the implementation of project management and one-way analysis of variance between means per managerial group

ITEM CODE	GROUP A $\bar{X}$ RO S N=23	GROUP B $\bar{X}$ RO S N=97	GROUP C $\bar{X}$ RO S N=45	TOTAL# $\bar{X}$ RO S N=165	F-value	p-value	Tukey's grouping
H1	1.227 (1) 0.422	1.232 (1) 0.516	1.386 (1) 0.576	1.282 (1) 0.505	1.42	0.2457	(A;B;C)
H2	1.227 (1) 0.518	1.362 (2) 0.545	1.477 (3) 0.588	1.355 (2) 0.550	1.55	0.2160	(A;B;C)
H3	1.409 (2) 0.656	1.421 (3) 0.610	1.409 (2) 0.618	1.413 (3) 0.628	0.01	0.9928	(A;B;C)
H4	2.500 (5) 1.123	2.340 (6) 1.053	2.205 (6) 1.002	2.348 (6) 1.059	0.60	0.5522	(A;B;C)
H5	1.818 (3) 0.650	1.716 (4) 0.800	1.705 (4) 0.695	1.746 (4) 0.715	0.19	0.8263	(A;B;C)
H6	2.046 (4) 0.878	1.926 (5) 0.909	1.955 (5) 0.796	1.976 (5) 0.861	0.16	0.8497	(A;B;C)

One-way ANOVA with $\alpha = 0.05$ RO=Rank Order #Average of 3 groups

Table 4.83: Rank order of human-oriented factors according to relative importance for contributing to the implementation of project management and one-way analysis of variance between means per application group

ITEM CODE	GROUP I $\bar{X}$ RO S N=71	GROUP II $\bar{X}$ RO S N=63	GROUP III $\bar{X}$ RO S N=33	TOTAL# $\bar{X}$ RO S N=167	F-value	p-value	Tukey's grouping
H1	1.169 (1) 0.377	1.413 (1) 0.663	1.212 (1) 0.415	1.265 (1) 0.485	4.06	0.0190*	(1;3)(2;3)
H2	1.268 (2) 0.506	1.508 (3) 0.619	1.406 (2) 0.560	1.394 (2) 0.562	3.09	0.0484*	(1;2;3)
H3	1.366 (3) 0.660	1.444 (2) 0.590	1.424 (3) 0.561	1.411 (3) 0.604	0.29	0.7519	(1;2;3)
H4	2.254 (6) 1.010	2.286 (6) 1.054	2.625 (6) 1.128	2.239 (6) 1.064	1.50	0.2256	(1;2;3)
H5	1.634 (4) 0.615	1.794 (4) 0.744	1.788 (4) 0.960	1.739 (4) 0.773	0.92	0.3989	(1;2;3)
H6	1.859 (5) 0.833	2.064 (5) 0.896	1.909 (5) 0.947	1.944 (5) 0.892	0.94	0.3943	(1;2;3)

One-way ANOVA with $\alpha = 0.05$ RO=Rank Order #Average of 3 groups
*Result statistically significant at 0.05 level

Table 4.84: VARIMAX-rotated four-factor pattern of items P1-P14 of "philosophical success factors" only

ITEM CODE	FACTOR 1#	FACTOR 2#	FACTOR 3#	FACTOR 4#	Communality*
P14	0.6848				0.5108
P12	0.6449				0.4872
P11	0.5544	0.4861			0.5496
P5	0.5251				0.3422
P13	0.3575				0.2261
P10	0.3472	0.3348			0.2611
P6		0.5769			0.3927
P7		0.4935			0.3643
P4		0.4522			0.2203
P8			0.6597		0.4544
P9			0.5987		0.4562
P1			0.3722		0.2187
P3					0.1792
P2				0.6983	0.5001
Cronbach ∝	0.7708	0.7013**	0.7138**		

Shaded area in factor columns indicates where shifts occur because of greater loadings on the next factor
#Only values greater than 0.3000 reported
*Indicates the amount of variance explained by the four factors
**Adjusted with the Spearman-Brown formula for comparison purposes

Table 4.85: VARIMAX-rotated three-factor pattern of items S1-S9 of "situational success factors" only

ITEM CODE	FACTOR 1#	FACTOR 2#	FACTOR 3#	Communality*
S7	0.7114			0.5445
S8	0.4926			0.2705
S9	0.4332			0.2542
S1				0.0962
S5		0.7903		0.5229
S4		0.6627		0.5782
S6	0.3606	0.3787		
S3			0.7145	0.5574
S2		0.4935	0.6894	0.5574
Cronbach ∝	0.5742	0.6817		

Shaded area in factor columns indicate where shifts occur because of greater loadings on the next factor
#Only values greater than 0.3000 reported
*Indicates the amount of variance explained by the three factors

Table 4.86: VARIMAX-rotated two-factor pattern of items O1-O8 of "organizational success factors" only

ITEM CODE	FACTOR 1#	FACTOR 2#	Communality*
O3	0.6307	0.3155	0.4974
08	0.6306		0.4343
06	0.6106		0.3901
04	0.5802		0.3526
07	0.3657	0.3518	0.2574
01		0.7010	0.4917
02	0.3236	0.5225	0.3777
05		0.4129	0.2329
Cronbach ∝	0.7324	0.6849**	

Shaded area in factor columns indicate where shifts occur because of greater loadings on the next factor
#Only values greater than 0.3000 reported
*Indicates the amount of variance explained by the two factors
**Adjusted with the Spearman-Brown formula for comparison purposes

Table 4.87: VARIMAX-rotated three-factor pattern of items J1-J10 of "job-dimensional success factors" only

ITEM CODE	FACTOR 1#	FACTOR 2#	FACTOR 3#	Communality*
J1	0.6250			0.4037
J2	0.5952			0.3637
J3	0.4878			0.3455
J4	0.4526			0.3447
J5	0.3928			0.2748
J7	0.3235			0.1885
J8		0.7840		0.6363
J6	0.3148	0.5835		0.4437
J9		0.5468		0.3443
J10			0.7508	0.5860
Cronbach ∝	0.6845	0.7959**		

Shaded area in factor columns indicate where shifts occur because of greater loadings on the next factor
#Only values greater than 0.3000 reported
*Indicates the amount of variance explained by the three factors
**Adjusted with the Spearman-Brown formula for comparison purposes

Table 4.88: VARIMAX-rotated two-factor pattern of items H1-H6 of "human-oriented success factors" only

ITEM CODE	FACTOR 1#	FACTOR 2#	Communality*
H6	0.6018		0.4026
H4	0.5173		0.2677
H5	0.7172		0.3150
H3	0.3504		0.1746
H2		0.7430	0.6312
H1		0.6290	0.4027
Cronbach ∝	0.5862		

Shaded area in factor columns indicate where shifts occur because of greater loadings on the next factor
#Only values greater than 0.3000 reported
*Indicates the amount of variance explained by the two factors

4.6.2 Question 4.2 (Code C1-C13)

The second question in part D of the questionnaire asked respondents to

indicate the relative importance of the factors which they believed would restrain the implementation of project management. The results of the one-way analysis of variance between the means for the different groups were as indicated in tables 4.89 and 4.90. The results of the factor analysis for the combined restraining factors were as indicated in table 4.91.

Table 4.89: Rank order of combined restraining factors according to relative importance for restraining the implementation of project management and one-way analysis of variance between means per managerial group

ITEM CODE	GROUP A $\bar{X}$ RO S N=23	GROUP B $\bar{X}$ RO S N=97	GROUP C $\bar{X}$ RO S N=45	TOTAL# $\bar{X}$ RO S N=165	F-value	p-value	Tukey's grouping
C1	2.273 (3) 1.054	1.642 (4) 0.662	1.909 (4) 0.982	1.941 (4) 0.899	5.72	0.0040*	(A;C)(B;C)
C2	1.773 (2) 0.850	1.432 (2) 0.646	1.750 (3) 0.809	1.652 (3) 0.768	4.02	0.0198*	(A;B;C)
C3	2.500 (5) 0.947	2.074 (6) 0.820	2.046 (6) 0.866	2.207 (6) 0.878	2.47	0.0879	(A;B;C)
C4	2.409 (4) 1.033	2.147 (8) 0.894	2.068 (7) 0.809	2.208 (7) 0.912	1.08	0.3420	(A;B;C)
C5	1.636 (1) 0.656	1.600 (3) 0.702	1.659 (2) 0.743	1.632 (2) 0.700	0.11	0.8960	(A;B;C)
C6	2.273 (3) 1.126	2.000 (5) 0.930	2.091 (8) 1.014	2.121 (5) 1.023	0.73	0.4853	(A;B;C)
C7	2.636 (6) 0.896	2.138 (7) 0.936	2.000 (5) 0.965	2.258 (8) 0.932	3.54	0.0313*	(A;B)(B;C)
C8	2.727 (9) 0.974	2.330 (9) 0.902	2.523 (11) 0.991	2.527 (11) 0.956	1.85	0.1604	(A;B;C)
C9	3.091 (10) 0.900	2.716 (13) 1.030	2.705 (12) 1.087	2.837 (13) 1.006	1.28	0.2808	(A;B;C)
C10	2.714 (8) 1.041	2.602 (12) 0.927	2.523 (11) 0.990	2.613 (12) 0.986	0.29	0.7502	(A;B;C)
C11	2.682 (7) 0.885	2.463 (11) 1.021	2.273 (10) 0.757	2.473 (10) 0.888	1.44	0.2405	(A;B;C)
C12	2.409 (4) 0.988	2.337 (10) 1.000	2.233 (9) 0.997	2.326 (9) 0.995	0.27	0.7665	(A;B;C)
C13	1.773 (2) 0.964	1.411 (1) 0.608	1.546 (1) 0.694	1.577 (1) 0.755	2.59	0.0780	(A;B;C)

One-way ANOVA with $\alpha = 0.05$ RO=Rank Order #Average of 3 groups
*Result statistically significant at 0.05 level

Table 4.90: Rank order of combined restraining factors according to the relative importance for restraining the implementation of project management and one-way analysis of variance between means per application group

ITEM CODE	GROUP I $\bar{X}$ RO S N=71	GROUP II $\bar{X}$ RO S N=63	GROUP III $\bar{X}$ RO S N=33	TOTAL# $\bar{X}$ RO S N=167	F-value	p-value	Tukey's grouping
C1	1.704 (4) 0.744	1.984 (5) 0.871	1.636 (3) 0.929	1.775 (4) 0.848	2.65	0.0735	(1;2;3)
C2	1.535 (2) 0.651	1.603 (2) 0.794	1.515 (1) 0.755	1.551 (2) 0.733	0.21	0.8085	(1;2;3)
C3	2.197 (6) 0.856	2.000 (6) 0.861	2.091 (6) 0.879	2.096 (5) 0.865	0.88	0.4184	(1;2;3)
C4	2.268 (7) 0.910	2.143 (8) 0.840	2.000 (5) 0.935	2.137 (7) 0.895	1.06	0.3488	(1;2;3)
C5	1.648 (3) 0.739	1.635 (3) 0.789	1.667 (4) 0.645	1.650 (3) 0.724	0.02	0.9802	(1;2;3)
C6	2.197 (6) 1.037	1.905 (4) 0.875	2.212 (7) 1.053	2.105 (6) 0.988	1.80	0.1688	(1;2;3)
C7	2.183 (5) 0.946	2.081 (7) 0.911	2.242 (8) 1.091	2.169 (8) 0.983	0.35	0.7049	(1;2;3)
C8	2.366 (8) 0.849	2.581 (12) 0.950	2.364 (9) 1.113	2.437 (11) 0.971	1.01	0.3664	(1;2;3)
C9	2.831 (12) 1.000	2.794 (13) 1.080	2.667 (11) 1.051	2.764 (13) 1.044	0.28	0.7525	(1;2;3)
C10	2.771 (11) 0.951	2.532 (11) 0.900	2.469 (10) 1.047	2.591 (12) 0.966	1.55	0.2145	(1;2;3)
C11	2.662 (10) 0.925	2.444 (10) 0.912	2.000 (5) 0.968	2.369 (10) 0.935	5.72	0.0040*	(1;2)(3)
C12	2.465 (9) 0.908	2.194 (9) 0.989	2.394 (9) 1.171	2.351 (9) 1.023	1.27	0.2830	(1;2;3)
C13	1.479 (1) 0.714	1.508 (1) 0.669	1.606 (2) 0.864	1.531 (1) 0.749	0.35	0.7074	(1;2;3)

One-way ANOVA with $\propto = 0.05$ RO=Rank Order #Average of 3 groups
*Result statistically significant at 0.05 level

Table 4.91: VARIMAX-rotated four-factor pattern of items C1-C13 of "combined restraining factors" only

ITEM CODE	FACTOR 1#	FACTOR 2#	FACTOR 3#	FACTOR 4#	Communality*
C10	0.7279				0.5536
C11	0.5762				0.3993
C12	0.5546				0.3296
C4	0.4963				0.4907
C6		0.6779			0.5297
C13		0.6068			0.4657
C5		0.5834			0.3612
C8			0.8362		0.7754
C1			0.5599		0.3709
C7			0.3508		0.3289
C9					0.2002
C2			0.3042	0.5398	0.4493
C3				0.4838	0.3392
Cronbach ∝	0.7346	0.7480**	0.7005**		

Shaded area in factor columns indicate where shifts occur because of greater loadings on the next factor
#Only values greater than 0.3000 reported
*Indicates the amount of variance explained by the four factors
**Adjusted with the Spearman-Brown formula for comparison purposes

4.7 THEORETICAL CHANCES OF SUCCESSFULLY IMPLEMENTING PROJECT MANAGEMENT

4.7.1 Question 4.3 (Code Q4_3)

The final question in part D of the questionnaire asked respondents to again predict the chances of successfully implementing project management in their department, given expressly their answers provided in questions 4.1 (see subsection 4.6.1) and 4.2 (see subsection 4.6.2). The results were as indicated in tables 4.92 and 4.93.

This question thus required respondents to take their answers to the two

previous questions into consideration, before predicting the chances of successfully implementing project management. The two previous questions dealt with a force field analysis of success driving and success restraining factors in the implementation of project management. It is therefore appropriate that an association, through correlational analysis, be examined between each of the success driving and success restraining factors in this question with question 4.3. The results were as indicated in tables 4.94 to 4.99.

Table 4.92: Chances of successfully implementing project management with answers provided earlier in force field analysis and one-way analysis of variance between means per managerial group

CHANCES OF IMPLEMENTING	GROUP A N c% r%	GROUP B N c% r%	GROUP C N c% r%	TOTAL N %T
SMALL (0-24%)(*w1*)	1 4% 8%	8 9% 67%	3 7% 25%	12 7%
LIMITED (25-49%)(*w2*)	3 13% 8%	22 23% 61%	11 24% 31%	36 22%
REASONBLE (50-74%)(*w3*)	13 57% 16%	49 52% 60%	20 45% 24%	82 51%
GOOD (75-99%)(*w4*)	6 26% 19%	15 16% 47%	11 24% 34%	32 20%
TOTAL %T	23 14%	94 58%	45 28%	162 100% 100%
$\bar{X}$ S	3.046 0.767	2.763 0.825	2.841 0.869	2.883# 0.820#
ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping	
CODE Q4_3	1.04	0.3565	(A;B;C)	

χ^2=3.703 p=0.717 C=0.149 N=162 #Average of 3 groups
One-way ANOVA with α=0.05

Table 4.93: Chances of successfully implementing project management with answers provided earlier in force field analysis and one-way analysis of variance between means per application group

CHANCES OF IMPLEMENTING	GROUP I N c% r%	GROUP II N c% r%	GROUP III N c% r%	TOTAL N %T
SMALL (0-24%)(*w1*)	4 6% 33%	5 8% 42%	3 9% 25%	12 7%
LIMITED (25-49%)(*w2*)	10 14% 27%	16 26% 43%	11 33% 30%	37 22%
REASONBLE (50-74%)(*w3*)	32 46% 38%	37 60% 43%	16 49% 19%	85 52%
GOOD (75-99%)(*w4*)	24 34% 77%	4 6% 13%	3 9% 10%	31 19%
TOTAL %T	70 42%	62 38%	33 20%	165 100% 100%
$\bar{X}$ S	3.086 0.847	2.645 0.726	2.576 0.792	2.769# 0.788#

ONE-WAY ANOVA	F-value	p-value under Ho	Tukey's grouping
CODE Q4_3	7.01	0.0012**	(1)(2;3)

χ^2=21.513 p=0.001* C=0.340 N=165 #Average of 3 groups
*Results statistically significant at a 0.005 level where χ^2=18.548 for 6 degrees of freedom
One-way ANOVA with $\propto$=0.05
**Result statistically significant at a 0.05 level

Table 4.94: Pearson product-moment correlation coefficients between philosophical factors and question 4.3 for whole research population

ITEM CODE	TOTAL N	r- correlation coefficient	p-value under Ho
P1	168	0.0376	0.6281
P2	167	-0.1894	0.0142*
P3	168	-0.0897	0.2476
P4	167	0.0459	0.5558
P5	167	-0.0496	0.5247
P6	166	-0.1129	0.1477
P7	168	-0.0446	0.5663
P8	168	0.0516	0.5070
P9	168	-0.0856	0.2698
P10	168	-0.0282	0.7170
P11	167	-0.1264	0.1036
P12	168	-0.1153	0.1368
P13	168	0.0205	0.7918
P14	163	-0.0827	0.2937

*Result statistically significant at 0.05 level

Table 4.95: Pearson product-moment correlation coefficients between situational factors and question 4.3 for whole research population

ITEM CODE	TOTAL N	r- correlation coefficient	p-value under Ho
S1	168	-0.0218	0.7795
S2	160	-0.0906	0.2545
S3	160	-0.1166	0.1419
S4	167	-0.0961	0.2165
S5	167	-0.1047	0.1780
S6	168	-0.0051	0.9478
S7	168	-0.1366	0.0775
S8	168	-0.0740	0.3403
S9	167	0.0023	0.9767

Table 4.96: Pearson product-moment correlation coefficients between organizational factors and question 4.3 for whole research population

ITEM CODE	TOTAL N	r- correlation coefficient	p-value under Ho
O1	167	0.0920	0.2370
O2	167	-0.0898	0.2486
O3	161	-0.0699	0.3784
O4	167	-0.0180	0.8171
O5	167	0.0847	0.2767
O6	164	-0.1070	0.1727
O7	166	0.0995	0.2021
O8	163	0.0239	0.7620

Table 4.97: Pearson product-moment correlation coefficients between job-dimensional factors and question 4.3 for whole research population

ITEM CODE	TOTAL N	r- correlation coefficient	p-value under Ho
J1	168	-0.0479	0.5371
J2	168	-0.0063	0.9356
J3	168	-0.0049	0.9498
J4	168	-0.1583	0.0404*
J5	166	-0.2282	0.0031*
J6	168	-0.1103	0.1548
J7	168	-0.0026	0.9730
J8	168	-0.0939	0.2260
J9	168	-0.0279	0.7201
J10	168	-0.0379	0.6253

*Result statistically significant at 0.05 level

Table 4.98: Pearson product-moment correlation coefficients between human-oriented factors and question 4.3 for whole research population

ITEM CODE	TOTAL N	r- correlation coefficient	p-value under Ho
H1	168	0.0124	0.8733
H2	167	-0.0967	0.2139
H3	168	0.0017	0.9825
H4	166	-0.0771	0.3237
H5	168	-0.1567	0.0425*
H6	168	0.0033	0.9662

*Result statistically significant at 0.05 level

Table 4.99: Pearson product-moment correlation coefficients between combined restraining factors and question 4.3 for whole research population

ITEM CODE	TOTAL N	r- correlation coefficient	p-value under Ho
C1	168	0.0586	0.4504
C2	168	0.0096	0.9015
C3	168	0.1553	0.0444*
C4	168	0.1573	0.0417*
C5	168	-0.0368	0.6360
C6	168	0.0531	0.4945
C7	167	0.1258	0.1053
C8	167	-0.0102	0.8955
C9	168	-0.0622	0.4235
C10	165	0.1047	0.1808
C11	168	0.0336	0.6652
C12	167	0.0407	0.6018
C13	168	-0.1152	0.1371

*Result statistically significant at 0.05 level

4.8 CHAPTER SUMMARY

Chapter 4 presented the results of the research questionnaire. No attempt was made to either discuss or analyze these results but, where applicable, explanations were given for the statistical terminology and methodology used.

After the introduction in section 4.1, section 4.2 presented further details of the research population delineation (subsection 4.2.1) and categorization (subsection 4.2.2). It was noted that due to historical political events in South Africa, both during and after the research questionnaires were despatched and collected, some of the potential participants (i.e. the former independent states and self-governing territories work departments), no longer existed and had to be excluded from the research. The estimated total size of the population was reduced from 380 to 240. The number of research questionnaires returned was 172, representing a reponse rate of over 70 percent. The statistical techniques utilized for the different parts of the questionnaire were described in subsection 4.2.3.

Section 4.3 presented the results for part A of the questionnaire. This part dealt with the overall classification of the research population. In section 4.4, the results for part B of the questionnaire were reported. Part B questions focused on the general orientation of respondents to formalized project management.

Section 4.5 provided the results for part C of the questionnaire. This section dealt mainly with the process-related issues of formulating and implementing a strategy for project management. Section 4.6 presented the results for part D of the questionnaire. Part D questions focused on the content-related issues of strategy formulation and implementation.

Finally, section 4.7 presented the research results for the last part of the research questionnaire. This part attempted to theoretically assess the chances of successfully implementing a strategy of formalized project management in public sector work departments.

Chapter 5 will present the discussion and analysis of the results, with specific reference to the theoretical framework of the research as presented in chapter 2.

CHAPTER 5

DISCUSSION OF THE RESEARCH RESULTS

5.1 INTRODUCTION

This chapter presents the discussion and analysis of the research results reported in chapter 4. Where applicable, the results are also examined in association with the theoretical research propositions, formulated in chapter 2, the literature review.

Section 5.2 presents the discussion of results as related to part A of the research questionnaire. This part dealt with the general classification of the respondents. Section 5.3 presents the discussion of the results for part B of the questionnaire. Part B examined the general orientation of personnel employed in public sector work departments to project management.

The discussion of the results of part C of the questionnaire is presented in section 5.4. Part C focused on the process-related issues of formulating and implementing a strategy for formalized project management. The results of the content-related issues, which were incorporated into part D of the research questionnaire, are discussed in section 5.5.

Section 5.6 presents the discussion of the results of the last portion of the questionnaire. In this portion, an attempt was made to theoretically assess the chances of successfully implementing formalized project management in public sector work departments. Finally, section 5.7 gives the chapter summary.

5.2 PART A: CLASSIFICATION OF RESEARCH POPULATION

5.2.1 Number of respondents

As noted in subsection 4.2.1, 172 questionnaires were returned out of an estimated research population size of 240. While 172 questionnaires were returned, only an average of 167 could finally be used. The difference is attributed to a number of questionnaires that had to be discarded during the data capturing process. This was necessary because in some cases, questionnaires were completed by individuals who, based on the research population criteria, had to be excluded from participating in this research and in other cases, complete blank questionnaires were returned. These discarded questionnaires typically represent variations of α and β errors described in section 3.6. The 70 percent response rate after this correction is still high and the correction should not affect the overall representativeness of the research results.

5.2.2 Analysis of respondents

The results of the breakdown of the total number of respondents in the different managerial levels were reported in table 4.2. Middle management (group B) represented the single largest proportion at 58 percent, then lower or functional management (group C) at 27 percent and finally, top management (group A) constituted 15 percent. Ideally, the proportion of lower management should be greater in order to better reflect the typical hierarchical structures found in organizations.

The breakdown of the total number of respondents in the different application groups was reported in table 4.3. Group I (where formal project management is applied) represented 43 percent of the respondents, group II (where informal project management is applied) - 37 percent, and group

III (where no project management is applied) - only 20 percent.

Given the high proportion of respondents who indicated that formal project management was already being applied in their departments and a focus point of this research, namely to develop an implementation strategy for formalized project management in public sector work departments generally, this result was unexpectedly high. However, it may be argued that the results of the research could still be of use to departments where informal or no project management is currently being applied (in this case 57 percent of respondents work in such departments). Furthermore, a close examination of the results for group I may provide valuable insights into the practical experiences of respondents gained during the actual implementation of formalized project management in their respective departments.

5.2.3 Number of years worked in a public sector work department

As a whole (hereafter referred to as "overall"), the average number of years that respondents had worked in a public sector work department was 12. The breakdown of the average number of years in the different managerial groups (see table 4.4) was 16 for top management (group A), 13 for middle management (group B), and 6 for lower management (group C). Statistically, groups A and B are similar but different to group C.

In the case of the breakdown in the different application groups (see table 4.5), the average number of years was very similar for all three groups. For group I (formal project management) it was 12 years, while for both group II (informal project management) and group III (no project management), it was 11 years.

5.2.4 Professional status of respondents

Overall, the breakdown of respondents in the different professional groups were: architects (24%), engineers (32%), quantity surveyors (23%) and "others" (21%). The "others" category included personnel, such as land surveyors, town and regional planners, valuers and works supervisors.

The professional status of respondents in the different managerial groups showed some variation from the overall breakdown as reported above (see table 4.6). Deviations of more than 5 percent which are noteworthy are group A - engineers (+18%), quantity surveyors (-6%), and "others" (-13%); group C - architects (-6%) and "others" (+11%).

In the case of the breakdown in the different application groups (see table 4.7), the professional status of respondents in each group again did not reflect the overall pattern reported above. Deviations of more than 5 percent which are noteworthy are group I - "others" (+10%); group II - architects (+7%); group III - architects (-9%), engineers (+11%), quantity surveyors (+13%) and "others" (-15%).

5.2.5 Highest formal qualification

Overall, the breakdown of the highest formal qualification of respondents was degrees (69%), diplomas (20%) and "other" (11%). The personnel in the "other" category generally held senior certificates.

The highest formal qualification of respondents in the different managerial groups showed some variation from the overall breakdown reported above (see table 4.8). Deviations of more than 5 percent which are noteworthy are group A - degrees (+6%) and "other" (-11%); group C - degrees (-6%) and "others" (+9%). Moreover, it should be noted that all respondents in group

A either held a degree or diploma, while in groups B and C, 90 percent and 80 percent of the respondents, respectively, were similarly qualified.

In the case of the breakdown in the different application groups (see table 4.9), the highest formal qualifications of respondents in each group again did not reflect the overall breakdown reported above. Deviations of more than 5 percent which are noteworthy are group III - degrees (+16%) and diplomas (-11%).

5.3 PART B: GENERAL ORIENTATION TO PROJECT MANAGEMENT

5.3.1 Current application of project management

Overall, 65 percent of the respondents confirmed that project management was currently being applied in their departments. The confirmation percentages in the different managerial groups (see table 4.10) were group A - 75%, group B - 61% and group C - 67%.

5.3.2 Extent of current application of project management

The overall breakdown of the total number of respondents in the different application groups was previously reported in subsection 4.3.1. There 80 percent of respondents indicated that project management was either formally or informally applied. The division in the different managerial groups, reported in table 4.11, showed minor variations from the overall pattern. For group A, the corresponding figure was 83%, for group B - 81% and for group C - 77%.

5.3.3 General attitude towards project management

Overall, 53 percent of the respondents perceived that their department held a positive, 41 percent a neutral and only 6 percent a negative attitude towards project management. The division in the different managerial groups, reported in table 4.12, showed some variation from the overall pattern. Deviations of more than 5 percent which are noteworthy are group A - positive (+10%) and neutral (-12%); group C - positive (+6%).

In the case of the breakdown in the different application groups (see table 4.13), group I was statistically, significantly different to groups II and III. In this group (note it is the group where formal project management is currently being applied), 75 percent of the respondents perceived their department's attitude as positive, 22 percent as neutral and only 3 percent as negative. In group II (where informal project management is currently being applied), 36 percent of the respondents perceived their department's attitude towards project management as positive, 61 percent as neutral and 3 percent as negative. Of particular interest is group III (where no project management is currently being applied), where 32 percent of the respondents perceived their department's attitude as positive, 49 percent as neutral but 19 percent (the highest of the three application groups) as negative. Statistically, groups II and III are similar but different to group I.

Focusing on the respondents' own attitude towards project management, overall, 83 percent held a positive, 14 percent a neutral and only 3 percent a negative attitude. The division in the different managerial groups, reported in table 4.14, showed minor variations from the overall pattern. Deviations of more than 5 percent which are noteworthy are group A - positive (+8%), neutral (-14%) and negative (+6%). In the case of the breakdown in the different application groups (see table 4.15), there were also minor variations from the overall pattern. Deviations of more than 5 percent

which are noteworthy are group I - positive (+7%) and neutral (-8%); group III - positive (-8%).

5.3.4 General knowledge of project management

Overall, 35 percent of the respondents felt they had a good knowledge about project management concepts and philosophy, 50 percent an average knowledge and 15 percent a limited knowledge. The division in the different managerial groups, reported in table 4.16, showed some variation from the overall pattern. Deviations of more than 5 percent which are noteworthy are group A - good (+15%), average (-8%) and limited (-7%); group C - average (-6%) and limited (+10%). In the case of the breakdown in the different application groups (see table 4.17), there were also some variations from the overall pattern. Deviations of more than 5 percent which are noteworthy are group I - good (+8%) and limited (-7%); group II - good (-8%) and average (+7%); group III - average (-7%) and limited (+9%).

With regard to knowledge about project management techniques, overall, 23 percent of the respondents felt they had a good knowledge, 38 percent an average knowledge and 39 percent a limited knowledge. The division in the different managerial groups, reported in table 4.18, showed some variation from the overall pattern. Deviations of more than 5 percent which are noteworthy are group A - average (+14%) and limited (-17%); group B - average (-6%). In the case of the breakdown in the different application groups (see table 4.19), there were also some variations from the overall pattern. Deviations of more than 5 percent which are noteworthy are group I - good (+6%) and limited (-5%); group II - good (-10%) and average (+8%); group III - average (-13%) and limited (+11%).

5.4 PART C: MANAGEMENT OF CHANGE

5.4.1 Chances of successfully implementing project management with no changes in current operations

Overall, 21 percent of the respondents believed that the chances of successfully implementing project management, with no changes in the way it currently operated, were small (less than a 25% chance of success), 28 percent believed the chances were limited (25% but less than a 50% chance of success), 39 percent believed the chances were reasonable (50% but less than a 75% chance of success), and 12 percent believed the chances were good (greater than a 75% chance of success).

The division in the different managerial groups, reported in table 4.20, showed some variation from the overall pattern. Deviations of more than 5 percent which are noteworthy are group A - limited (-7%) and reasonable (+11%); group B - limited (+6%); group C - limited (-8%) and good (+6%). In the case of the breakdown in the different application groups (see table 4.21), there were also some variations from the overall pattern. Deviations of more than 5 percent which are noteworthy are group I - small (-7%), limited (-7%), reasonable (+6%) and good (+8%); group III - small (+15%), limited (+17%), reasonable (-23%) and good (-9%). Statistically, groups I and II are similar but significantly different to group III. This means that group III (where no project management is being applied) believe that the chances of successfully implementing project management are significantly different (in this case, smaller) to groups I and II.

5.4.2 Past performance of the departments

Overall, 35 percent of the respondents believed that the past performance of their department was good in meeting its objectives, 56 percent believed

it was average and only 9 percent believed it was poor. The division in the different managerial groups, reported in table 4.22, showed some variation from the overall pattern. Deviations of more than 5 percent which are noteworthy are group A - good (-6%), average (+15%) and poor (-9%); group B - average (-6%). In the case of the breakdown in the different application groups (see table 4.23), there were also some variations from the overall pattern. Deviations of more than 5 percent which are noteworthy are group I - good (+10%) and average (-9%); group III - good (-11%) and average (+8%).

With regard to the past performance of the department in utilizing its resources efficiently, overall, 24 percent of the respondents believed it was good, 58 percent believed it was average, and 18 percent believed it was poor. The division in the different managerial groups, reported in table 4.24, showed some variation from the overall pattern. Deviations of more than 5 percent which are noteworthy are group A - good (-7%), average (+13%) and poor (-6%); group C - poor (+6%). In the case of the breakdown in the different application groups (see table 4.25), there were also some variations from the overall pattern. Deviations of more than 5 percent which are noteworthy are group III - average (-8%) and poor (+7%).

In summary, 91 percent of the respondents overall, believed that the past performance of their departments in meeting their objectives was average or good, while 82 percent believed that the past performance of their departments in utilizing their resources efficiently was average or good. With reference to research proposition 74 (see subsection 2.4.8.2), it may thus be concluded that the past performance of the departments are perceived to be effective. The first part of that proposition can thus generally be confirmed.

5.4.3 Disrupting forces in the departments

Overall, 81 percent of the respondents confirmed that there were disrupting forces which restrained their department from obtaining optimal performance. The confirmation percentages in the different managerial groups (see table 4.26) were group A - 88%, group B - 82% and group C -75%. In the case of the breakdown in the different application groups (see table 4.27), the confirmation percentages in the different application groups were as follows: group I - 85%, group II - 81% and group III - 76%.

With reference to research proposition 62 (see subsection 2.4.3), it may thus be concluded that there are disrupting forces present which restrain the departments from obtaining optimal performance.

5.4.4 Adjustments necessary inside the departments

Overall, 84 percent of the respondents confirmed that adjustments inside the department were necessary in order to maintain or improve on their performance. The confirmation percentages in the different managerial groups (see table 4.28) were group A - 78%, group B - 85% and group C - 83%. In the case of the breakdown in the different application groups (see table 4.29), the confirmation percentages in the different application groups were group I - 81%, group II - 83% and group III - 87%.

With reference to research proposition 62 (see subsection 2.4.3), it may thus be concluded that adjustments inside the departments are necessary in order to maintain or improve on their performances.

5.4.5 Origin of the force providing the greatest stimulus for change

Overall, 55 percent of the respondents believed that the origin of forces providing the greatest stimulus for change were external while 45 percent believed it was internal. The division in the different managerial groups, reported in table 4.30, differed from the overall pattern. Deviations of more than 5 percent which are noteworthy are group A - external (-7%) and internal (+7%). Groups B and C thus conform to the overall pattern where the origin of the greatest force was external but group A (top management) believed the origin of the force to be internal.

In the case of the breakdown in the different application groups (see table 4.31), there were only minor variations from the overall pattern but no deviations of more than 5 percent are noted. All three groups believed that the origin of greatest force providing the stimulus for change was external.

With reference to research proposition 62 (see subsection 2.4.3), it may thus be concluded that the origin of the force providing the greatest stimulus for change is external (note that for group A - top management it was internal). The proposition can thus generally be confirmed.

5.4.6 General attitude of the departments towards change

Overall, 56 percent of the respondents believed that their department generally resisted changes while 44 percent believed that their department embraced changes. The division in the different managerial groups, reported in table 4.32, differed from the overall pattern. Deviations of more than 5 percent which are noteworthy are group A - embraced (+15%) and resisted (-15%). Groups B and C thus conform to the overall pattern where changes were generally resisted but group A (top management) believed that changes were generally embraced.

In the case of the breakdown in the different application groups (see table 4.33), there were also some variations from the overall pattern. Deviations of more than 5 percent which are noteworthy are group I - embraced (+15%) and resisted (-15%). Groups II and III thus conform to the overall pattern where changes are generally resisted but group I (where formal project management is applied) believed that changes are generally embraced.

With regard to the general attitude of the departments towards the initiation of changes, overall 56 percent of the respondents believed changes were infrequently initiated, while 44 percent believed they were frequently initiated. The division in the different managerial groups, reported in table 4.34, showed some variation from the overall pattern. Deviations of more than 5 percent which are noteworthy are group A - frequently (+10%) and infrequently (-10%). Groups B and C thus conform to the overall pattern where changes generally are infrequently initiated but group A (top management), believed that changes are frequently initiated.

In the case of the breakdown in the different application groups (see table 4.35), there were also some variations from the overall pattern. Deviations of more than 5 percent which are noteworthy are group III - frequently (-14%) and infrequently (+14%). All three groups believed that generally, changes are infrequently initiated.

In summary, it may thus be concluded that departments acting on changes generally resist and infrequently initiate changes. Note that for group A (top management) and group I (where formal project management is applied) changes are generally embraced. With reference to research proposition 63 (see subsection 2.4.3), it may thus be concluded (with these two exceptions noted) that the departments generally reflect resistance to change. The proposition can thus generally be confirmed.

5.4.7 Contribution of implementing project management

Overall, 78 percent of the respondents confirmed that they believed implementing project management would contribute to a solution to deal with the disrupting forces which affect their departments. The confirmation percentages in the different managerial groups (see table 4.36) were group A - 83%, group B - 76% and group C - 81%. In the case of the breakdown in the different application groups (see table 4.37), the confirmation percentages were group I - 76%, group II - 82% and group III - 77%.

With reference to research proposition 61 (see subsection 2.4.2), it may thus be concluded that implementing project management in public sector work departments through a managed organizational change process may contribute to dealing with the disrupting forces which restrict them from obtaining optimal performance. The proposition can thus generally be confirmed.

5.4.8 Number of changes needed to implement project management

Overall, 29 percent of the respondents believed that many changes would be needed in order to implement project management effectively and efficiently in their department, 69 percent believed that some changes were needed, while only 2 percent believed that no changes would be needed.

The division in the different managerial groups, reported in table 4.38, differed from the overall pattern. Deviations of more than 5 percent which are noteworthy are group A - many changes (-8%) and no changes (+6%). In the case of the breakdown in the different application groups (see table 4.39), there were also some variations from the overall pattern. Deviations of more than 5 percent which are noteworthy are group I - many changes (-7%) and some changes (+6%); group III - many changes (+16%) and

some changes (+14%). Statistically, groups I and II as well as groups II and III are similar. Groups I and III are significantly different to each other. This means that for group I (where formal project management is being applied), the number of changes needed to implement project management are significantly different (in this case, less) to those for group III where no project management is applied.

In summary, it may thus be concluded that some changes would be needed in order to implement project management. Note that for group I, the number of changes needed are significantly less than for group III where no project management is applied. This result is relevant for propositions 74 and 75. These propositions will be discussed in subsections 5.4.17 and 5.4.20.

5.4.9 Criteria for the selection of change strategies

Overall, 63 percent of the respondents confirmed that they believed that substantial time was needed to implement project management. The confirmation percentages in the different managerial groups (see table 4.40) were group A - 40%, group B - 70% and group C - 60%. Group A (top management) thus rather believed that implementing project management would not require substantial time. Statistically, groups A and C as well as groups B and C are similar. Groups A and B are significantly different to each other. This means that for group A, the time needed to implement project management is significantly different (in this case, less) than for group B. In the case of the breakdown in the different application groups (see table 4.41), the confirmation percentages were group I - 63%, group II - 66% and group III - 59%.

Overall, 53 percent of the respondents confirmed that they did not believe that extensive changes were needed to implement project management.

The confirmation percentages in the different managerial groups (see table 4.42) were group A - 70%, group B - 48% and group C - 55%. Group B (middle management) thus rather believed that extensive changes would be needed to implement project management. In the case of the breakdown in the different application groups (see table 4.43), the confirmation percentages (statistically significant) were group I - 64%, group II - 45% and group III - 39%. Groups II and III thus rather believed that extensive changes would be needed in order to implement project management.

Overall, 55 percent of the respondents confirmed that the general attitude of personnel employed within their departments to implementing project management was favourable. The confirmation percentages in the different managerial groups (see table 4.44) were group A - 70%, group B - 53% and group C - 52%. In the case of the breakdown in the different application groups (see table 4.45), the confirmation percentages were group I - 57%, group II - 49% and group III - 50%. Groups II and III thus did not show a clear indication whether personnel within their departments would either be favourably or unfavourably disposed to implementing project management.

Overall, 55 percent of the respondents rejected the notion that an outside consultant would be the best to manage the implementation of project management. The rejection percentages in the different managerial groups (see table 4.46) were group A - 64%, group B - 56% and group C - 49%. Group C (lower management) thus did not show a clear indication of its preference in the use of an outside consultant or not. In the case of the breakdown in the different application groups (see table 4.47), the confirmation percentages were group I - 59%, group II - 58% and group III - 35%. Group III thus rather believed that an outside consultant would be best to manage the implementation of project management.

In summary, it may thus be concluded that (1) substantial time was needed to implement project management (note that for group A the time needed was significantly less) (2) extensive changes would not be needed (note that for group B extensive changes were indicated and for groups II and III extensive changes, statistically significant, were indicated) (3) the general attitude of personnel was favourable (note that groups II and III did not give a clear indication of personnel favourableness) and (4) an outside consultant would not be the best person to manage the implementation of project management (note that for group III an outside consultant was the preferred choice).

Given the obtained research results, research proposition 66 (see sub-section 2.4.5.1) can thus not be confirmed. The proposition should rather be reformulated to reflect the position as follows: (1) time required - long (2) extensiveness of change - small (3) favourableness of change target - favourable and (4) suitability of change agent - manager from within the department to manage the implementation.

5.4.10 Objects of change for implementing project management

Overall, the rank order for the objects of change for implementing project management with the greatest priority was (1) procedures (organizational processes) (2) functions (individual task behaviour) (3) direction (strategic direction) and (4) attitudes (organizational culture). The division in the different managerial groups, reported in table 4.48, differed slightly from the overall pattern. Deviations which are noteworthy are group C - ranked attitudes in (3) and direction in (4). A plausible explanation for their rank order is that lower management typically do not concern themselves with the strategic direction of the organization. In the case of the breakdown in the different application groups (see table 4.49), there were also some variations from the overall pattern. Deviations which are noteworthy are

group I - ranked attitudes as (3) direction as (4); groups II and III - ranked direction as (2) and functions as (3). A plausible explanation for this higher rank order of strategic direction is that in these groups formal project management is not yet applied and it would require a strategic decision to do so.

Given the obtained research results, research proposition 64 (see subsection 2.4.4.1) can thus not be confirmed. The proposition should rather be reformulated to reflect the rank order as follows: (1) procedures (organizational processes) (2) functions (individual task behaviour) (3) direction (strategic direction) and (4) attitudes (organizational culture).

5.4.11 Methods of change for implementing project management

Overall, the rank order for the methods of change for implementing project management which were the most appropriate was (1) structural (2) human-oriented (3) managerial and (4) technological. The division in the different managerial groups, reported in table 4.50, differed from the overall pattern. Deviations which are noteworthy are group A - ranked the positions as: (1) human-oriented (2) structural (3) technological and (4) managerial. In the case of the breakdown in the different application groups (see table 4.51), there were also some variations from the overall pattern. Deviations which are noteworthy are group I - ranked technological methods in (3) and managerial methods in (4); group III - ranked human-oriented methods in (1) and structural methods in (2).

With reference to research proposition 65 (see subsection 2.4.4.2), it may thus be concluded that the rank order of methods which are most appropriate for implementing project management in public sector work departments is (1) structural (2) human-oriented (3) managerial and (4) technological. The proposition can thus generally be confirmed.

5.4.12 Change policies for implementing project management

Overall, 57 percent of the respondents confirmed that a change policy for implementing project management show allow for gradual implementation. The confirmation percentages in the different managerial groups (see table 4.52) were group A - 61%, group B - 58% and group C - 52%. In the case of the breakdown in the different application groups (see table 4.53), the confirmation percentages were group I - 50%, group II - 65% and group III - 55%. Group I thus did not show a clear indication whether a change policy for project management should allow for either gradual of immediate implementation.

With reference to research proposition 70 (see subsection 2.4.7.1), it may thus be concluded that a change policy for implementing project management should allow for gradual implementation. The proposition can thus generally be confirmed.

5.4.13 Change strategies for implementing project management

Overall, the rank order for the change strategies for implementing project management which were the most appropriate was (1) informational (2) facilitative (3) attitudinal and (4) political. The division in the different managerial groups, reported in table 4.54, showed no variation from the overall pattern. In the case of the breakdown in the different application groups (see table 4.55), there were some differences to the overall pattern. Deviations which are noteworthy are groups I and III - both ranked facilitative strategies as (1) and informational strategies as (2).

Given the obtained research results, research proposition 67 (see subsection 2.4.5.2) can thus not be confirmed. The proposition should rather be reformulated to reflect the rank order as follows: (1) informational

(2) facilitative (3) attitudinal and (4) political.

5.4.14 Critical activities for implementing project management

Overall, the rank order for the most critical activities for implementing project management was (1) implementing (2) supporting (institution-alization) and (3) feasibility. The division in the different managerial groups, reported in table 4.56, differed from the overall pattern. Deviations which are noteworthy are group B - ranked supporting as (1) feasibility as (2) and implementing as (3); group C - ranked feasibility as (2) and supporting as (3). In the case of the breakdown in the different application groups (see table 4.57), there were some variations from the overall pattern. Deviations which are noteworthy are group I - ranked supporting as (1) feasibility as (2) and implementing as (3); group II - ranked supporting as (1) imple-menting as (2) and feasibility as (3); group III - ranked feasibility as (2) and supporting as (3).

Given the obtained research results, research proposition 71 (see subsection 2.4.7.2) can thus not be confirmed. The proposition should rather be reformulated to reflect the rank order as (1) implementing (2) supporting and (3) feasibility.

5.4.15 Participants for implementing project management

Overall, the rank order for the best person suited to fulfil the role of change manager when implementing project management was (1) top-level management (2) middle management (3) project management and (4) lower or functional management. The division in the different managerial groups, reported in table 4.58, differed from the overall pattern. Deviations which are noteworthy are group A - ranked both project and lower management as (3); group B - ranked lower management as (3) and

project management as (4). In the case of the breakdown in the different application groups (see table 4.59), there were also some variations from the overall pattern. Deviations which are noteworthy are group I - ranked lower management as (3) and project management as (4); groups II and III - ranked middle management as (1) and top-level management as (2).

Overall, the rank order for the best person suited to fulfil the role of change agent when implementing project management was (1) middle management (2) project management (3) lower or functional management and (4) top-level management. The division in the different managerial groups, reported in table 4.60, differed from the overall pattern. Deviations which are noteworthy are group A - ranked lower management as (2) and project management as (3). In the case of the breakdown in the different application groups (see table 4.61), there were also some variations from the overall pattern. Deviations which are noteworthy are group I - ranked top-level management as (2) project management as (3) and lower management as (4); group III - ranked project management as (1) and middle management as (2).

Overall, the rank order for the best person suited to fulfil the role of the change target when implementing project management was (1) lower or functional management (2) project management (3) middle management and (4) top-level management. The division in the different managerial groups, reported in table 4.62, differed from the overall pattern. Deviations which are noteworthy are group C - ranked project management as (1) and both middle and lower management as (2). In the case of the breakdown in the different application groups (see table 4.63), there were also some variations from the overall pattern. Deviations which are noteworthy are groups I and II - ranked project management as (1) and lower management as (2); group III - ranked middle management as (1) lower management as (2) top-level management as (3) and project management as (4).

With reference to research proposition 68 (see subsection 2.4.6), it may thus be concluded that the persons best suited for implementing project management are the change manager - top-level management; the change agent - middle management; and the change target - lower or functional management. The proposition can thus generally be confirmed.

5.4.16 Source of resistance to implementing project management

Overall, the rank order for the greatest source (or barrier to) of resistance when implementing project management was (1) understanding (2) acting and (3) acceptance. The division in the different managerial groups, reported in table 4.64, differed from the overall pattern. Deviations which are noteworthy are group C - ranked acting as (1) and understanding as (2). In the case of the breakdown in the different application groups (see table 4.65), there were some variations from the overall pattern. Deviations which are noteworthy are group III - ranked acting as (1) acceptance as (2) and understanding as (3).

Given the obtained research results, research proposition 69 (see subsection 2.4.6.2) can thus not be confirmed. The proposition should rather be reformulated to reflect the rank order as follows: (1) understanding (2) acting and (3) acceptance.

5.4.17 "Easy fit" for project management in departments

Overall, 66 percent of the respondents confirmed that they believed that project management would easily fit into "the way things were done" in their department and also "the way people thought and acted". The confirmation percentages in the different managerial groups (see table 4.66) were group A - 83%, group B - 61% and group C - 69%. In the case of the breakdown in the different application groups (see table 4.67), the

confirmation percentages were group I - 77%, group II - 60% and group III - 48%. Group III thus did not believe that project management would easily fit into "the way things were done" in their department and also with "the way people thought and acted".

With reference to research proposition 75 (see subsection 2.4.8.3), it may thus be concluded that implementing project management in public sector work departments would easily fit in with "the way things were done" in the departments and also with "the way people thought and acted". Note the exception of group III (where no project management is applied), where they believe the opposite to be true.

This research proposition was formulated based on the Pearce and Robinson (1985) model, which required both an indication of the number of changes needed (see subsection 5.4.8) and the potential compatibility of the changes with the existing organizational culture. Previously it was reported that some changes would be needed in order to implement project management and, based on the result discussed above, these changes are compatible with the existing culture. Consequently, the departments are in the "synergistic position" (according to the model) where emphasis should be placed on reinforcing the existing culture.

Given the obtained research results, research proposition 75 can thus not be confirmed. The proposition should rather be reformulated to reflect the position as follows: few changes would be necessary to implement formalized project management and the changes that are needed are compatible with the existing organizational culture. The departments are thus in the synergistic position and should focus on reinforcing the existing organizational culture.

5.4.18 Change of organizational structure

Overall, 67 percent of the respondents confirmed that they believed that the organizational structure had to be changed in order to implement project management. The confirmation percentages in the different managerial groups (see table 4.68) were group A - 52%, group B - 73% and group C - 62%. In the case of the breakdown in the different application groups (see table 4.69), the confirmation percentages in the different application groups were group I - 61%, group II - 73% and group III - 76%.

With reference to research proposition 73 (see subsection 2.4.8.1), it may thus be concluded that the organizational structures in public sector work departments need to be changed in order to implement project management. The proposition can thus generally be confirmed.

5.4.19 Means to ensure continued application of project management

Overall, the rank order for the best means to ensure the continued application of project management was (1) management support (organizational leadership) (2) personnel attitudes (organizational culture) and (3) structure (structural adjustments). The division in the different managerial groups, reported in table 4.70, differed from the overall pattern. Deviations which are noteworthy are group A - ranked personnel attitudes as (1) and management support as (2). In the case of the breakdown in the different application groups (see table 4.71), there were also some variations from the overall pattern. Deviations which are noteworthy are group II - ranked personnel attitudes as (1) and management support as (2); group III ranked structure as (2) and personnel attitudes as (3).

Given the obtained research results, research proposition 72 (see subsection 2.4.8) can thus not be confirmed. The proposition should rather

be reformulated to reflect the rank order as follows: (1) management support (organizational leadership) (2) personnel attitudes (organizational culture) and (3) structure (structural adjustments).

5.4.20 Managerial assignment position for implementing project management

Overall, the rank order for the most effective managerial assignment position for implementing project management was (1) internal management only (2) combination of internal and new outside management and (3) new outside management only. The division in the different managerial groups, reported in table 4.72, showed no variations from the overall pattern. In the case of the breakdown in the different application groups (see table 4.73), there were also no variations from the overall pattern.

With reference to research proposition 74 (see subsection 2.4.8.2), it may thus be concluded that the most effective managerial assignment position for implementing project management would be the use of internal managers from within the department only.

This research proposition was formulated based on the Pearce and Robinson (1985) model, which required both an indication of the number of changes needed (see subsection 5.4.8) and the assessment of past performance (see subsection 5.4.2). Previously it was reported that some changes would be needed in order to implement project management and that the past performance of the departments was perceived to be effective. Based on these results, the departments are in the "stability situation" (according to the model) where the major emphasis should be on the existing managers via internal promotions and transfers. The result for this question, namely that internal managers were seen as the most effective managers for implementing project management, thus confirms the

respondents' selection as also indicated in the model.

Given the obtained research results, research proposition 74 can thus not be confirmed. The proposition should rather be reformulated to reflect the position as follows: few changes would be necessary to implement formalized project management and the past performance of the departments is perceived to be effective. The departments are thus in the stability situation and the main emphasis should be on using internal managers from within the department to implement project management.

5.4.21 Summary of research propositions 61 to 75

A summary of the results for part C of the questionnaire in association with research propositions is presented in table 5.1.

Table 5.1: Summary of research propositions 61 to 75

PROPOSITION	CONFIRMED	REFORMULATED	REFORMULATION
61: 5.4.7	YES		
62: 5.4.3 : 5.4.4 : 5.4.5	YES*		* Note exception for Group A
63: 5.4.6	YES*		* Note exceptions for Groups A and III
64: 5.4.10	NO	YES	Rank order of objects of change: (1) procedures (organizational processes) (2) functions (individual task behaviour) (3) direction (strategic direction) (4) attitudes (organizational culture)
65: 5.4.11	YES		
66: 5.4.9	NO	YES	Criteria for change strategies: (1) time required - long (2) extensiveness of change - small (3) change target - favourable (4) change agent - manager from within the department
67: 5.4.13	NO	YES	Rank order of change strategies: (1) informational (2) facilitative (3) attitudinal (4) political
68: 5.4.15	YES		
69: 5.4.16	NO	YES	Rank order of sources of resistance: (1) understanding (2) acting (3) acceptance
70: 5.4.12	YES		
71: 5.4.14	NO	YES	Rank order of critical activities: (1) implementing (2) supporting (3) feasibility
72: 5.4.19	NO	YES	Rank order of institutionalizing means: (1) management support (leadership) (2) personnel (organizational culture) (3) structure (structural adjustments)
73: 5.4.18	YES		
74: 5.4.2 : 5.4.8 : 5.4.20	NO	YES	Managerial assignment position: The departments are in the "stability" situation and the main major emphasis should beon using managers within the department to implement project management
75: 5.4.8 : 5.4.17	NO	YES	Managing organizational culture: The departments are in the "synergistic" position and focus should be on reinforcing the existing culture

5.5 PART D: FORCE FIELD ANALYSIS OF PROJECT MANAGEMENT

5.5.1 Criteria for the interpretation of the average values

To gain some insight into the relative importance of the different factors, table 5.2 provides simplistic interpretation criteria which may be used to interpret the various average values obtained for each factor. In general, if all the respondents (100%) indicated that the factor was considered very important, the average ($\bar{X}$) for the factor would be equal to 1.000. Similarly, if all the respondents indicated that the factor was considered important, the average would be equal to 2.000, 3.000 for desirable and 4.000 for not important. Note that each average indicated in table 5.2 reflects the "best" possible position in terms of these importance categories. For example, an average of 1.100 suggests that 90 percent of the respondents believe the factor to be very important while the remaining percentage of the respondents (10%) believe the factor to be only important. If the remaining respondents were evenly distributed among the other possible categories of important, desirable and not important, the average would be equal to 1.200. This value, which is greater than 1.100, thus suggests a "less favourable" position.

The results for the force field analysis of project management are discussed in subsections 5.5.2 to 5.5.9. Subsection 5.5.10 provides a summary of the significant and important contributors (or restrainers) for the implementation of formalized project management in public sector work departments. The rank orders for the factors which respondents believed either contributed the most or had the most restraining influence on the implementation of formalized project management are highlighted in summarized tables. Factors considered significant, with average values of 1.500 or lower, are shaded in these tables. Based on the simple interpretation criteria in table 5.2, at least 50 percent of the respondents

believe these factors to be very important (or very restraining) while the remainder believe them to be important (or restraining). These factors may be regarded as significant contributors (or restrainers) in the implementation of formalized project management in public sector work departments.

Table 5.2: Interpretation criteria

AVERAGE ($\bar{X}$)	% VERY IMPORTANT	% IMPORTANT	% DESIRABLE	% NOT IMPORTANT
1.000	**100**	**0**	**0**	**0**
1.100	90	10	0	0
1.200	80	20	0	0
1.300	70	30	0	0
1.400	60	40	0	0
1.500	50	50	0	0
1.600	40	60	0	0
1.700	30	70	0	0
1.800	20	80	0	0
1.900	10	90	0	0
2.000	**0**	**100**	**0**	**0**
2.100	0	90	10	0
2.200	0	80	20	0
2.300	0	70	30	0
2.400	0	60	40	0
2.500	0	50	50	0
2.600	0	40	60	0
2.700	0	30	70	0
2.800	0	20	80	0
2.900	0	10	90	0
3.000	**0**	**0**	**100**	**0**
3.100	0	0	90	10
3.200	0	0	80	20
3.300	0	0	70	30
3.400	0	0	60	40
3.500	0	0	50	50
3.600	0	0	40	60
3.700	0	0	30	70
3.800	0	0	20	80
3.900	0	0	10	90
4.000	**0**	**0**	**0**	**100**

Factors with averages above 1.500 up to 2.000, indicated with an asterisk (*), are only regarded as important contributors or restrainers. Based on the interpretation criteria of table 5.2, either more than 50 percent of the respondents believe these factors to be important and the remainder

believe them to be very important (values above 1.500 but below 2.000) or 100 percent believe the factors to be important (as in the case of a value of 2.000).

5.5.2 Contributing philosophical factors in project management implementation

The rank order of philosophical factors (see tables 4.74 and 4.75) which respondents believed contributed the most to the implementation of project management are summarized in table 5.3. From table 4.84 it should be noted that the four "new" hypothetical variables (or factors) obtained through factor analysis are not readily interpretable and are thus not discussed further.

Table 5.3: Philosophical factors

RANK ORDER	OVERALL	GROUP A	GROUP B	GROUP C	GROUP I	GROUP II	GROUP III
(1)	P9	P9	P4	P9	P9	P1	P4
(2)	P1	P13	P1;P9	P1	P4	P9	P1;P9; P10
(3)	P4	P4	P10	P4	P1	P4	P13
(4)	P13	P1;P7; P10	P13	P6	P6	P13*	P3*;P6*
(5)	P6;P10	P6*	P6*	P10*	P10	P6*	P5*;P7*; P12*

* Average greater than 1.500 up to 2.000

Overall, the following research propositions (RP) can thus be confirmed as significant (or when important - indicated with an *) philosophical contributors to the implementation of project management: RP:39 (P9) (top-level management commitment and support for project management concept); RP:1 (P1) (routine involvement in project-type activities); RP:8 (P4) (realistic project objectives); RP:58 (P13) (integrative planning and control); RP:9

(P6) (key project management elements) and RP:36 (P10) (training and education in project management concepts, methods and techniques).

In the different managerial groups, other research propositions which may be confirmed are group A - RP:41 (P7) (project-oriented information and control system). In the different application groups, other research propositions which may be confirmed are group III - RP:6 (P3*) (application of the systems approach to management), RP:47 (P5*) (clear definition of project success), RP:41 (P7*) (project-oriented information system) and RP:55 (P12*) (possible advantages of project management).

5.5.3 Contributing situational factors in project management implementation

The rank order of situational factors (see tables 4.76 and 4.77) which respondents believed contributed the most to the implementation of project management are summarized in table 5.4. From table 4.85 it should be noted that the three "new" hypothetical variables (or factors) obtained through factor analysis are again not readily interpretable and are thus not discussed further.

Table 5.4: Situational factors

RANK ORDER	OVERALL	GROUP A	GROUP B	GROUP C	GROUP I	GROUP II	GROUP III
(1)	S1	S1	S1	S1	S1	S1	S1
(2)	S8*	S6	S8*	S8	S8	S8*	S8*
(3)	S6*	S8*	S6*	S7*	S7	S6*	S7*
(4)	S7*	S7*	S7*	S4*	S6*	S4*	S6*
(5)	S4*	S4*	S4*	S6*	S4*	S7*	S4*

* Average greater than 1.500 up to 2.000

Overall, the following research propositions (RP) can thus be confirmed as

significant (or when important - indicated with an *) situational contributors to the implementation of project management: RP:53 (S1) (effective control of projects during execution); RP:54 (S8*) (ability to increase the strength of the driving forces of project success); RP:57 (S6*) (coordinating and integrating large projects with interdisciplinary and independent activities); RP:59 (S7*) (ability to deal with complex tasks in both slow and fast changing external environments); and RP:43 (S4*) (sensitivity to environmental influences). In the different managerial and application groups, there are no other research propositions which may additionally be confirmed.

5.5.4 Contributing organizational factors in project management implementation

The rank order of organizational factors (see tables 4.78 and 4.79) which respondents believed contributed the most to the implementation of project management are summarized in table 5.5. From table 4.86 it should be noted that the two "new" hypothetical variables (or factors) obtained through factor analysis, are again not readily interpretable and are thus not discussed further.

Table 5.5: Organizational factors

RANK ORDER	OVERALL	GROUP A	GROUP B	GROUP C	GROUP I	GROUP II	GROUP III
(1)	O7*	O7*	O7*	O1*	O7*	O7*	O7*
(2)	O2*		O2*	O7*	O2*	O1*	O2*
(3)	O1*		O4*	O2*	O4*	O2*	O1*
(4)			O1*		O1*	O4*	O4*
(5)			O6*				

* Average greater than 1.500 up to 2.000

Overall, the following research propositions (RP) can thus be confirmed as

significant (or when important - indicated with an *) organizational contributors to the implementation of project management: RP:37 (O7*) (effective transitional management); RP:26 (O2*) (a dynamic organizational structure); and RP:4 (O1*) (an adaptable organizational form). In the different managerial groups, other research propositions which may be confirmed are group B - RP:33 (O6*) (a matrix organizational structure). In the different application groups, there are no other research propositions which may additionally be confirmed.

5.5.5 Contributing job-dimensional factors in project management implementation

The rank order of job-dimensional factors (see tables 4.80 and 4.81) which respondents believed contributed the most to the implementation of project management are summarized in table 5.6. From table 4.87 it should be noted that the three "new" hypothetical variables (or factors) obtained through factor analysis, are again not readily interpretable and are thus not discussed further.

Table 5.6: Job-dimensional factors

RANK ORDER	OVERALL	GROUP A	GROUP B	GROUP C	GROUP I	GROUP II	GROUP III
(1)	J9	J8;J9	J1	J9	J9	J8;J9	J8
(2)	J8	J4	J8	J1	J1	J1	J1
(3)	J1	J3*;J6*	J9	J8	J8	J3*	J6;J9
(4)	J3*;J6*	J1*	J3*;J6*	J3*;J6*	J3;J6	J4*	J3
(5)	J4*	J2*	J4*	J4*	J4	J6*	J2*

* Average greater than 1.500 up to 2.000

Overall, the following research propositions (RP) can thus be confirmed as significant (or when important - indicated with an *) job-dimensional contributors to the implementation of project management: RP:52 (J9)

(communication and information sharing between participants); RP:51 (J8) (commitment, cooperation between participants); RP:10 (J1) (variety of project manager roles to be performed); RP:11 (J3*) (principal responsibility of project manager for project end-item); RP: 19 (J6*) (cohesive project team established) and RP:12 (J4*) (interface role of project manager). In the different managerial groups, other research propositions which may be confirmed are group A - RP:24 (J2*) (project manager held accountable for success/failure of project). In the different application groups, other research propositions which may be confirmed are group III - RP:24 (J2*) (project manager held accountable for success/failure of project).

5.5.6 Contributing human-oriented factors in project management implementation

The rank order of human-oriented factors (see tables 4.82 and 4.83) which respondents believed contributed the most to the implementation of project management are summarized in table 5.7. From table 4.88 it should be noted that the two "new" hypothetical variables (or factors) obtained through factor analysis, are again not readily interpretable and are thus not discussed further.

Table 5.7: Human-oriented factors

RANK ORDER	OVERALL	GROUP A	GROUP B	GROUP C	GROUP I	GROUP II	GROUP III
(1)	H1	H1;H2	H1	H1	H1	H1	H1
(2)	H2	H3	H2	H3	H2	H3	H2
(3)	H3	H5*	H3	H2	H3	H2*	H3
(4)	H5*		H5*	H5*	H5*	H5*	H5*
(5)	H6*		H6*	H6*	H6*		H6*

* Average greater than 1.500 up to 2.000

Overall, the following research propositions (RP) can thus be confirmed as significant (or when important - indicated with an *) human-oriented contributors to the implementation of project management: RP:7 (H1) (managerial proficiency of project manager); RP:14 (H2) (desired personal characteristics of project manager); RP:15 (H3) (behavioural, business and technical skills of project manager); RP:17 (H5*) (leadership through participation and delegation); and RP: 42 (H6*) (participant's satisfaction through all project stages). In the different managerial and application groups, there are no other research propositions which may additionally be confirmed.

5.5.7 Other contributing factors in project management implementation

From an open-ended question in the questionnaire, which was placed after the structured questions which dealt with contributing factors in project management implementation, other factors indicated were project manager's integrity, the use of computer programs, mature instruction (not manipulation), attitude of humility, earning respect, showing initiative, providing incentives, setting objectives, belief in excellence in the work place, logical and realistic thinking, commitment to superior product quality, emphasis on planning not doing, participation through delegation of work, cost controls and integration of diverse professional skills. From these extracts it can be seen that the emphasis of these other factors identified was placed on factors within the job-dimensional and human-oriented categories.

5.5.8 Combined restraining factors in project management implementation

The rank order of combined restraining factors (see tables 4.89 and 4.90) which respondents believed would be the most constraining in the

implementation of project management are summarized in table 5.8. From table 4.91 it should be noted that the four "new" hypothetical variables (or factors) obtained through factor analysis, are again not readily interpretable and are thus not discussed further.

Table 5.8: Combined restraining factors

RANK ORDER	OVERALL	GROUP A	GROUP B	GROUP C	GROUP I	GROUP II	GROUP III
(1)	C13*	C5*	C13	C13*	C13	C13*	C2*
(2)	C5*	C2* C13*	C2	C5*	C2*	C2*	C13*
(3)	C2*		C5*	C2*	C5*	C5*	C1*
(4)	C1*		C1*	C1*	C1*	C6*	C5*
(5)				C7*		C1*	C4* C11*

* Average greater than 1.500 up to 2.000

Overall, the following research propositions (RP) can thus be confirmed as significant (or when important - indicated with an *) restrainers in the implementation of project management: RP:49 (C13*) (failures due to unsuitable project manager); RP:50 (C5*) (failures due to user not being involved); RP:48 (C2*) (failures due to unsupportive top-level management); RP:5 (C1*) (traditional management approaches used for project-type work). In the different managerial groups, other research propositions which may be confirmed are group C - RP:27 (C7*) (pure functional differentiated organization). In the different application groups, other research propositions which may be confirmed are group III - RP:18 (C4*) (high tendency for conflict in project environment) and RP:21 (C11*) (staffing complexities of the project team).

5.5.9 Other restraining factors in project management implementation

From an open-ended question in the questionnaire, which was placed after

the structured questions which dealt with restraining factors in project management implementation, other factors indicated were communication "blockages", people insensitivity, lack of patience and foresight, politicians, changing priorities within the departments, "the minister's last speech said ...", limiting financial and fiscal policies, too many chiefs, too many managers on a project, training of project managers and proof of project management skills. From these extracts it can be seen that the emphasis of these other factors identified was placed on factors within the situational, job-dimensional and human-oriented categories.

5.5.10 Summary of research propositions 1 to 60

A summary of the results for part D of the questionnaire in association with research propositions is presented in tables 5.9, 5.10 and 5.11.

Table 5.9: Summary of research propositions 1 to 20

PROPOSITION	CONFIRMED SIGNIFICANT	CONFIRMED IMPORTANT	COMMENTS
1: 5.5.2	**YES***		* All groups
2	NO	NO	
3	NO	NO	
4: 5.5.4	NO	**YES***	* All groups
5: 5.5.8	NO	**YES***	* All groups
6: 5.5.2	NO	**YES***	* Only for group III
7: 5.5.6	**YES***		* All groups
8: 5.5.2	**YES***		* All groups
9: 5.5.2	**YES***		* All groups
10: 5.5.5	**YES***		* All groups
11: 5.5.5	NO	**YES***	* All groups
12: 5.5.5	NO	**YES***	* All groups
13	NO	NO	
14: 5.5.6	**YES***		* All groups
15: 5.5.6	**YES***		* All groups
16	NO	NO	
17: 5.5.6	NO	**YES***	* All groups
18: 5.5.8	NO	**YES***	* Only group III
19: 5.5.5	NO	**YES***	* All groups
20	NO	NO	

Table 5.10: Summary of research propositions 21 to 40

PROPOSITION	CONFIRMED SIGNIFICANT	CONFIRMED IMPORTANT	COMMENTS
21: 5.5.8	NO	**YES***	* Only group III
22	NO	NO	
23	NO	NO	
24: 5.5.5	NO	**YES***	* Only for groups A and III
25	NO	NO	
26: 5.5.4	NO	**YES***	* All groups
27: 5.5.8	NO	**YES***	* Only for group C
28	NO	NO	
29	NO	NO	
30	NO	NO	
31	NO	NO	
32	NO	NO	
33: 5.5.4	NO	**YES***	* Only for group B
34	NO	NO	
35	NO	NO	
36: 5.5.2	**YES***		* All groups
37: 5.5.4	NO	**YES***	* All groups
38	NO	NO	
39: 5.5.2	**YES***		* All groups
40	NO	NO	

Table 5.11: Summary of research propositions 41 to 60

PROPOSITION	CONFIRMED SIGNIFICANT	CONFIRMED IMPORTANT	COMMENTS
41: 5.5.2	YES*	YES**	* Only for group A ** Only for group III
42: 5.5.6	NO	YES*	* All groups
43: 5.5.3	NO	YES*	* All groups
44	NO	NO	
45	NO	NO	
46	NO	NO	
47: 5.5.2	NO	YES*	* Only for group III
48: 5.5.8	NO	YES*	* All groups
49: 5.5.8	NO	YES*	* All groups
50: 5.5.8	NO	YES*	* All groups
51: 5.5.5	YES*		* All groups
52: 5.5.5	YES*		* All groups
53: 5.5.3	YES*		* All groups
54: 5.5.3	NO	YES*	* All groups
55: 5.5.2	NO	YES*	* Only for group III
56	NO	NO	
57: 5.5.3	NO	YES*	* All groups
58: 5.5.2	YES*		* All groups
59: 5.5.3	NO	YES*	* All groups
60	NO	NO	

5.6 THEORETICAL CHANCES OF SUCCESSFULLY IMPLEMENTING PROJECT MANAGEMENT

On the basis of the indication of relative importance for each of the contributing and restraining factors (see section 5.5), respondents were asked to theoretically assess the chances of successfully implementing project management in their departments. Overall, 7 percent of the respondents believed that the chances of successfully implementing project management were small (less than a 25% chance of success), 22 percent

believed the chances were limited (25% but less than a 50% chance of success), 51 percent believed the chances were reasonable (50% but less than a 75% chance of success), and 20 percent believed the chances were good (greater than a 75% chance of success).

The division in the different managerial groups, reported in table 4.92, differed from the overall pattern. Deviations of more than 5 percent which are noteworthy are group A - limited (-9%), reasonable (+6%) and good (+6%); group C - reasonable (-6%). In the case of the breakdown in the different application groups (see table 4.93), there were also some variations from the overall pattern. Deviations of more than 5 percent which are noteworthy are group I - limited (-8%) and good (+14%); group II - reasonable (+9%) and good (-14%); group III - limited (+11%) and good (-11%). Statistically, groups II and III are similar but significantly different to group I. This means that group I (where formal project management is being applied) believe that the chances of successfully implementing project management are significantly different (in this case, higher) than those of groups II and III.

Should the results above be compared to those of a similar question earlier in the questionnaire (where respondents were asked to assess the chances of successfully implementing project management but - with the express condition that no changes were made in the current operations of their departments), the respondents now generally believed that the chances of success were higher (see table 5.12). The higher chance of success thus reflects a theoretical position where the factors which respondents indicated as success-driving forces are "present" (or "strengthened") and the success-restraining forces are "absent" (or "weakened"). The importance of these factors may thus be linked to this higher theoretical chance of successful implementation of project management.

Table 5.12: Percentage comparison of chances of success

CHANCES OF SUCCESS	OVERALL	GROUP A	GROUP B	GROUP C	GROUP I	GROUP II	GROUP III
0-24%	-14%	-13%	-12%	-15%	-8%	-13%	-27%
25-49%	-6%	-8%	-11%	+4%	-8%	-1%	-13%
50-74%	+12%	+7%	+16%	+5%	+2%	+17%	+34%
75-99%	+8%	+14%	+7%	+6%	+14%	-3%	+6%

Overall, 71 percent (this figure was previously 51%) of the respondents believed that the chances of successfully implementing project management, given that the results of the force field analysis were taken into consideration, were above 50 percent. In the case of the breakdown in the different managerial groups, the corresponding figures are group A - 83% (was 72%), group B - 68% (was 45%) and group C - 69% (was 58%). In the case of the breakdown in the different application groups, the corresponding figures are group I - 80% (was 64%), group II - 66% (was 52%) and group III - 58% (was 13%).

The correlation coefficients between the question dealing with the indication of chances of successful implementation of project management and each of the success-driving and success-restraining factors were reported in tables 4.94 to 4.99. Significant negative correlations between the results for this question and the contributing factors are RP3 (factor P2) (division of project into distinct life cycle phases), RP12 (factor J4) (interface role of project manager), RP13 (factor J5) (influence of project manager to supplement the lack of formal authority) and RP17 (factor H5) (leading project team primarily through participation and delegation). Note that because of the data capturing method used, negative correlations reflect situations where high numerical values were obtained for one variable (in this case, when the chances of successful implementation are good) while low numerical values were obtained for the other variable (in

this case, when the importance of the contributing factor is considered high). While both RP3 and RP13 show significant correlations with the chances of successful implementation, they were not confirmed earlier (see subsection 5.5.10) as important contributors to the implementation of project management.

Significant positive correlations between the results for this question and the restraining factors are RP56 (factor C3) (possible disadvantages of project management) and RP18 (factor C4) (the high tendency for conflict in project environments). Note again that because of the data capturing method used, positive correlations reflect situations where low numerical values were obtained for one variable (in this case, when the chances of successful implementation are small) and low numerical values were obtained for the other variable (in this case, when the restraining impact of the factor is considered high). While RP56 shows significant correlation with the chances of successful implementation, it was not confirmed (see subsection 5.5.10) as an important restrainer to the implementation of project management.

5.7 CHAPTER SUMMARY

Chapter 5 presented the discussion and analysis of the research results. Where applicable, the results were examined in association with the theoretical research propositions which were formulated in the literature review in chapter 2.

Following the introduction in section 5.1, the results for part A of the research questionnaire were discussed in section 5.2. This part described the characteristics of the respondents in terms of the number of years they had worked in a public sector work department, the professional status of the respondents and, finally, their level of education.

The discussion of the results for part B of the questionnaire was presented in section 5.3. In this section the respondents' general orientation to project management was discussed. Apart from determining the extent to which project management was currently being applied in public sector work departments, the general attitude of the respondents to and knowledge of project management were also described.

The discussion of the results for part C of the questionnaire was presented in section 5.4. This part focused on the process-related issues of formulating and implementing a strategy for formalized project management. Specifically, the results of the application of the general change management model of Conner and Lake (1988) were discussed in association with the theoretical propositions formulated in section 2.4.

The results for the content-related issues, contained in part D of the research questionnaire, were discussed in section 5.5. In this section, the outcome of the force field analysis of success-driving and success-restraining factors in project management implementation were discussed and in this case, in association with the theoretical propositions formulated in section 2.3.

Section 5.6 provided the discussion of the results for the last portion of the questionnaire. In this part, an attempt was made to theoretically assess the chances of successfully implementing formalized project management in public sector work departments. The assessment is based on the express condition that the implementation strategy utilized would reflect the results of the force field analysis of project management and then be implemented through a managed organizational change process.

Chapter 6 presents the final conclusions and recommendations of the research.

CHAPTER 6

FINAL CONCLUSIONS AND RECOMMENDATIONS

6.1 INTRODUCTION

This chapter presents the final conclusions and summary of the research. Some recommendations are also made for future research.

In section 6.2 the characteristics of the research population are summarized. Section 6.3 summarizes the general orientation of the respondents, employed in public sector work departments, to project management. Section 6.4 summarizes and presents final conclusions on the management of organizational change which is implied should formalized project management be implemented in public sector work departments. Section 6.5 summarizes and presents some final conclusions on the force field analysis of project management. In this analysis both success-driving and success-restraining factors were identified in the implementation of formalized project management in public sector work departments. Section 6.6 presents final conclusions on the theoretical assessment of the chances of successfully implementing project management.

In section 6.7 recommendations are made for future research. These recommendations are based on the researcher's perceptions of areas of project management implementation in public sector departments generally, which should receive further attention. Finally, section 6.8 presents the chapter summary.

6.2 SUMMARY OF THE RESEARCH POPULATION CHARACTERISTICS

■ Number of the respondents

The original research population comprised nineteen public sector work departments which before 27 April 1994, existed in the Republic of South Africa. This number includes the four independent TBVC states and the six self-governing territories.

Research questionnaires were sent out to all these institutions, but because of the first all nonracial, democratic elections held on 27 April 1994 (this event brought about the reincorporation of the independent states into South Africa and the abolishment of the self-governing rule), a number of work departments had to be excluded from the original research population. The work departments thus excluded from the study were those of the former independent states and self-governing territories. The revised estimated size of the research population was reduced to 240 potential respondents. Of this revised figure, a total of 172 questionnaires were received back, representing a response rate of 72 percent.

■ General categorisation of the respondents

The respondents were broadly categorized into two groups. Firstly, according to managerial level (top, middle and lower management) and secondly, according to the extent of current application of project management (formal, informal or no application). The breakdown of the respondents in the different managerial levels was top-level management (15% of all the respondents), middle management (58%) and lower or functional management (27%). The breakdown of the respondents in the different application levels was formal project management (43% of all the respondents), informal project management (37%) and no project management (20%).

■ **Average number of years worked**

The overall average number of years that respondents had worked in a public sector department was twelve. The breakdown in the different managerial groups was sixteen years for top management, thirteen years for middle management and six years for lower management. In the case of the breakdown in the different application groups, there were no real variations from the overall average.

■ **Professional status of the respondents**

The overall breakdown of the respondents in the different professional groups was architects (24%), engineers (32%), quantity surveyors (23%) and "others" (21%). The "others" category included personnel, such as land surveyors, town and regional planners, valuers, and works supervisors.

■ **Highest formal qualification of the respondents**

The overall breakdown of the highest formal qualification of the respondents was degrees (69%), diplomas (20%) and "other" (11%). The personnel in the "other" category generally held senior certificates.

6.3 SUMMARY OF GENERAL ORIENTATION TO PROJECT MANAGEMENT

■ **General orientation to project management**

Overall, 53 percent of the respondents perceived that their department held a positive, 41 percent a neutral and only 6 percent a negative attitude to project management. Top-level management was generally more positive than both middle and lower management. In the case of the breakdown in the different application groups, group I (where formal project management is already applied) was significantly more positive to group II (where informal project management is applied) and group III (where no project management is applied). Group III indicated the highest proportion of

negative departmental attitudes.

Focusing on the respondents' own attitude to project management, overall, 83 percent held a positive, 14 percent a neutral and only 3 percent a negative attitude. Top-level management was again more positive than both middle and lower management. Group I was also generally more positive than both groups II and III.

■ **General knowledge of project management**

Overall, 35 percent of the respondents felt they had a good knowledge of project management concepts and philosophy, 50 percent an average knowledge and 15 percent a limited knowledge. Generally, top-level management indicated their perceived knowledge of project management concepts and philosophy as good while middle and lower management as average. Group I also perceived their knowledge as better than both groups II and III.

With regard to knowledge about project management techniques, 23 percent of the respondents overall felt they had a good knowledge, 38 percent an average knowledge and 39 percent a limited knowledge. Generally, top-level and lower management indicated their knowledge of project management techniques as average while middle management as limited. Groups I and II also indicated an average knowledge while group III only a limited knowledge.

6.4 SUMMARY OF MANAGEMENT OF ORGANIZATIONAL CHANGE

■ **Past performance of departments**

Overall, 35 percent of the respondents believed that the past performance of their department was good in meeting its objectives, 56 percent believed it was average and only 9 percent believed it was poor. The different

managerial and application groups showed little variation from this overall belief. With regard to the past performance of the department in utilizing its resources efficiently, overall, 24 percent of the respondents believed it was good, 58 percent believed it was average, and 18 percent believed it was poor. The different managerial and application groups again showed little variation from this overall believe. In summary, then, most respondents believe that the past performance of their departments in meeting their objectives and utilizing their resources efficiently are average or good. The past performance of the departments is thus generally perceived as effective.

■ **Disrupting forces which restrain the performance of departments**

Overall, 81 percent of the respondents confirmed that there were disrupting forces which restrained their department from obtaining optimal performance. The confirmation percentages in the different managerial and application groups showed little variation from this overall percentage.

■ **Adjustments needed inside departments**

Overall, 84 percent of the respondents confirmed that adjustments inside the department were necessary in order to maintain or improve on their past and present performance. The confirmation percentages in the different managerial and application groups showed little variation from this overall percentage.

■ **Origin of disrupting forces**

Overall, 55 percent of the respondents believed that the origin of forces providing the greatest stimulus for change was external. With the exception of top-level management, all other managerial and application groups held this belief.

■ **General attitude of departments to change**

Overall, 56 percent of the respondents believed that their department generally resisted changes. With the exception of top-level management and group I, where formal project management is applied, all other managerial and application groups held this belief. With regard to the general attitude of the departments to the initiation of changes, 56 percent of the respondents overall believed that changes were infrequently initiated. With the exception of top-level management, all other managerial groups and application groups again held this belief.

■ **Contribution of implementing project management**

Overall, 78 percent of the respondents confirmed that they believed implementing project management would contribute to a solution for dealing with the disrupting forces which affected their departments. The confirmation percentages in the different managerial and application groups showed little variation from this overall percentage.

■ **Number of changes needed for implementing project management**

Overall, 29 percent of the respondents believed that many changes would be needed in order to effectively and efficiently implement project management in their departments, 69 percent believed that some changes were needed, while only 2 percent believed that no changes would be needed. In the case of the breakdown in the different managerial groups there was little variation to this indication. In the case of the breakdown in the different application groups, group I believed the number of changes to be significantly less than group III.

■ **Time needed to implement project management**

Overall, 63 percent of the respondents confirmed that they believed that substantial time was needed to implement project management. Top-level management, however, believed that implementing project management

would not require substantial time.

■ **Extensiveness of changes needed to implement project management**

Overall, 53 percent of the respondents confirmed that they did not believe that extensive changes were needed to implement project management. Middle management, however, believed that extensive changes would be needed to implement project management. Groups II and III also believed that extensive changes would be needed to implement project management.

■ **General attitude of personnel to implementing project management**

Overall, 55 percent of the respondents confirmed that the general attitude of personnel employed within their departments to implementing project management was favourable. The confirmation percentages in the different managerial groups showed little variation from this overall percentage. In the case of the breakdown in the different application groups, groups II and III did not show a clear indication whether personnel within their departments would be either favourably or unfavourably disposed to implementing project management.

■ **The use of an outside consultant to manage implementation**

Overall, 55 percent of the respondents rejected the notion that an outside consultant would be the best to manage the implementation of project management. Lower management did not show a clear preference in the use of an outside consultant or not. In the case of the breakdown in the different application groups, group III believed that an outside consultant would be best to manage the implementation of project management.

■ **Objects of change for implementing project management**

Overall, the rank order of the objects of change for implementing project management with the greatest priority were (1) procedures (organizational

processes) (2) functions (individual task behaviour) (3) direction (strategic direction) and (4) attitudes (organizational culture). The rank orders in the different managerial and application groups showed little variation from this overall pattern.

■ **Methods of change for implementing project management**

Overall, the rank order of the methods of change for implementing project management which were the most appropriate were (1) structural (2) human-oriented (3) managerial and (4) technological. The rank orders in the different managerial and application groups showed little variation from this overall pattern.

■ **Change policies for implementing project management**

Overall, 57 percent of the respondents confirmed that a change policy for implementing project management show allow for gradual implementation. The confirmation percentages in the different managerial groups showed little variation from this overall percentage. In the case of the breakdown in the different application groups, group I did not show a clear indication whether a change policy for project management should allow for either gradual of immediate implementation.

■ **Change strategies for implementing project management**

Overall, the rank order of the change strategies for implementing project management which were the most appropriate were (1) informational (2) facilitative (3) attitudinal and (4) political. The rank orders in the different managerial and application groups showed little variation from this overall pattern.

■ **Critical activities for implementing project management**

Overall, the rank order of the most critical activities for implementing project management were (1) implementing (2) supporting (institutionalization) and

(3) feasibility. The rank orders in the different managerial and application groups showed little variation from this overall pattern.

■ **Persons suited to fulfil change management positions**

Overall, the rank order of the best persons suited for implementing project management were the change manager should be top-level management, the change agent should be middle management and the change targets should be lower or functional management. The rank orders in the different managerial and application groups showed little variation from this overall pattern.

■ **Sources of resistance to implementing project management**

Overall, the rank order of the greatest source of resistance (or barrier to) when implementing project management were (1) understanding (2) acting and (3) acceptance. The rank orders in the different managerial and application groups showed little variation from this overall pattern.

■ **"Easy fit" for project management**

Overall, 66 percent of the respondents confirmed that they believed that project management would easily fit into "the way things were done" in their department and also "the way people thought and acted". The confirmation percentages in the different managerial groups showed little variation from this overall percentage. In the case of the breakdown in the different application groups, group III believed that project management would not easily fit into "the way things were done" in their department and also not with "the way people thought and acted". Based on the Pearce and Robinson (1985) model, departments generally are in the "synergistic position" where emphasis should be placed on reinforcing the existing organizational culture.

■ **Change of organizational structure**

Overall, 67 percent of the respondents confirmed that they believed that the organizational structure had to be changed in order to implement project management. The confirmation percentages in the different managerial and application groups showed little variation from this overall percentage.

■ **Continued application of project management**

Overall, the rank order of the best means to ensure the continued application of project management was (1) management support (organizational leadership) (2) personnel attitudes (organizational culture) and (3) structure (structural adjustments). The rank orders in the different managerial and application groups showed little variation from this overall pattern.

■ **Managerial assignment positions**

Overall, the rank order of the most effective managerial assignment position for implementing project management was (1) internal management only (2) combination of internal and new outside management and (3) new outside management only. The rank orders in the different managerial and application groups showed little variation from this overall pattern. Based on the Pearce and Robinson (1985) model, departments generally are in the "stability situation" where the major emphasis should be on the use of existing managers via internal promotions and transfers.

6.5 SUMMARY OF THE FORCE FIELD ANALYSIS OF PROJECT MANAGEMENT

■ **Contributing philosophical factors**

Overall, the following factors may be considered significant philosophical contributors to the implementation of project management: top-level management commitment and support for the project management

concept, the routine involvement in project-type activities, realistic project objectives being set, the use of integrative planning and control, the key project management elements of project manager, project team and project management system, and training and education in project management concepts, methods and techniques. In the different managerial groups, another significant factor for top-level management was: a project-oriented information and control system. In the different application groups, other important factors for group III were the application of the systems approach to management, the clear definition of project success, a project-oriented information system, and the possible advantages of project management.

■ **Contributing situational factors**

Overall, the following factor may be considered a significant situational contributor to the implementation of project management: the effective control of projects during execution. Important situational contributors were the ability to increase the strength of the driving forces of project success, coordinating and integrating large projects with interdisciplinary and independent activities, the ability to deal with complex tasks in both slow and fast changing external environments, and a sensitivity to environmental influences. In the different managerial and application groups, there were no other significant or important situational contributors.

■ **Contributing organizational factors**

Overall, the following factors may be considered important organizational contributors to the implementation of project management: effective transitional management, a dynamic organizational structure, and an adaptable organizational form. In the different managerial groups, another important factor for middle management was a matrix organizational structure. In the different application groups, there were no other significant or important organizational contributors.

■ **Contributing job-dimensional factors**

Overall, the following factors may be considered significant job-dimensional contributors to the implementation of project management: communication and information sharing between participants, commitment and cooperation between project participants, and the variety of project manager roles which need to be performed. Important job-dimensional contributors were the principal responsibility of the project manager for the project end-item, a cohesive project team, and the interface role of the project manager. In the different managerial groups, another important factor for top-level management was that the project manager be held accountable for the success/failure of a project. In the different application groups, another important factor for group III was also that the project manager be held accountable for the success/failure of a project.

■ **Contributing human-oriented factors**

Overall, the following factors may be considered significant human-oriented contributors to the implementation of project management: the managerial proficiency of the project manager, the desired personal characteristics of the project manager, and the behavioural, business and technical skills of the project manager. Other important human-oriented contributors were leadership through participation and delegation, and participant satisfaction through all project stages. In the different managerial and application groups, there were no other significant or important human-oriented contributors.

■ **Restraining factors**

Overall, the following factors may be considered important restrainers in the implementation of project management: the failures due to an unsuitable project manager, the failures due to the user not being involved, the failures due to unsupportive top-level management, and traditional management approaches which are used for project-type work. In the

different managerial groups, another important restraining factor for lower management was a purely functional differentiated organization. In the different application groups, other important restraining factors for group III were the high tendency of conflict in project environment, and the staffing complexities of the project team.

6.6 SUMMARY OF THE THEORETICAL CHANCES OF SUCCESS-FULLY IMPLEMENTING PROJECT MANAGEMENT

- **Chances of successfully implementing project management**

Overall, 7 percent of the respondents believed that the chances of successfully implementing project management were small (less than a 25% chance of success), 22 percent believed the chances were limited (25% but less than a 50% chance of success), 51 percent believed the chances were reasonable (50% but less than a 75% chance of success), and 20 percent believed the chances were good (greater than a 75% chance of success). In the case of the breakdown in the different managerial groups there was little variation to this indication. In the case of the breakdown in the different application groups, group I believed that the chances of successfully implementing project management were significantly higher than groups II and III did.

- **Improvement of chances of successfully implementing project management**

When this indication of theoretical chances of successfully implementing project management is compared to an earlier indication, where respondents were asked to assess the chances of success with the express condition that no changes were made in the current operations of their departments, the respondents generally indicated that the chances of success as higher. The higher chance of success reflects a theoretical position where the factors which respondents indicated as success-driving

forces are "present" (or "strengthened") and the success-restraining forces are "absent" (or "weakened"). The importance of these factors may be linked to this higher theoretical chance of successful implementation of project management.

- **Correlating contributing factors with a high chance of successful implementation of project management**

Contributing factors in project management implementation which showed significant correlations with a high theoretical chance of successfully implementing project management were the division of the project into distinct life cycle phases, the interface role of the project manager, the influence of the project manager in supplementing the lack of formal authority, and leading the project team primarily through participation and delegation.

- **Correlating restraining factors with a low chance of successful implementation of project management**

Restraining factors in project management implementation which showed significant correlations with a low theoretical chance of successfully implementing project management were the possible disadvantages of project management and the high tendency of conflict in project environments.

6.7 RECOMMENDATIONS FOR FUTURE RESEARCH

Acknowledging that the formal application of project management in public sector work departments is more prevalent than was believed prior to this study, the researcher is of the opinion that future research on project management implementation should be focused on detailed issues.

In this regard, emphasis should be placed on researching areas such as:

- Possible causal relationships, such as, why given a certain set of conditions in a department, a particular method of change or strategy for change is the preferred alternative for the implementation of project management.

- What other factors may be relevant in the implementation of project management given the inconclusive, uninterpretable results of the factor analysis of the success-driving and success-restraining forces.

- Whether the obtained results for this research would also be applicable to other public sector departments (such as the Departments of Agriculture, Water Affairs, and Defence) involved in project-type work.

- A comparative study to determine whether implementing project management in public sector departments is significantly different to organizations of the private sector.

6.8 CHAPTER SUMMARY

This last chapter presented the final conclusions and summary of the research together with recommendations for future research.

In section 6.2 the characteristics of the research population were summarized. Respondents were categorized into three managerial levels (top-level, middle and lower management) and three application groups (formal, informal and no project management). They generally represented professional employees, who on average had worked in a public sector department for twelve years.

Section 6.3 summarized the general orientation of the respondents to project management. Most respondents believed that their departments

held a positive attitude to project management. Top-level management and group I (respondents where formal project management was already being applied) generally perceived the attitude of their departments as more positive than the others. Most respondents themselves felt positive to project management while, top-level management and group I again were more positive than the others.

Section 6.4 summarized the management of organizational change and presented some final conclusions. While most respondents perceived the past performance of their departments as effective, they also agreed that implementing project management would contribute to a solution for dealing with the predominant external forces which destabilized and restrained their departments from obtaining optimal performance. Most respondents also agreed that some changes had to be made in order to implement project management, that gradual implementation was the preferred course of action and that an outside consultant would not be the person best suited to manage the implementation. Organizational procedures were the object of change with the greatest priority and the preferred method of change was structural. The change strategy most appropriate was informational while the greatest source of resistance was a barrier to understanding. While most respondents, with the exception of top-level management, believed their departments generally resisted and infrequently initiated changes, most respondents (but not group III) believed that implementing project management would easily fit into "the way things were done" in their department and also "the way people thought and acted". Based on the Pearce and Robinson (1985) model, departments generally are in the "synergistic position" where emphasis should be placed on reinforcing the existing culture.

Section 6.5 summarized the force field analysis of project management and presented some final conclusions in this regard. Both significant and

important contributing factors were confirmed in the five categories of philosophical, situational, organizational, job-dimensional and human-oriented factors. Generally, more significant factors were present in the philosophical and job-dimensional categories than the others. Important restraining factors were also confirmed. These closely resemble the three levels of causes of project management failures identified by Nicholas (1990) in his model.

Section 6.6 presented final conclusions on the theoretical assessment of the chances of successfully implementing project management. Most respondents believed that, should project management be implemented according to their indication of relative importance of success-contributing and success-restraining factors, the chances of success would be reasonable or good. Prior to their indication, respondents were generally evenly disposed to the chances of success being reasonable and good or limited and small.

In section 6.7 recommendations were made for future research. These recommendations were based on the researcher's perceptions on areas of project management implementation in public sector departments generally, which should receive further attention.

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ANNEXURE A

RESEARCH QUESTIONNAIRE

PROJECT MANAGEMENT SURVEY

PREFACE

I wish to thank you for your participation in this research project. The questionnaire you are about to complete forms part of the empirical research for a doctorate in business administration. This research is being done to determine if and how formalized project management could be implemented in departments or administrations of the public sector who are involved in construction activities by which building accommodation is provided.

SUGGESTIONS FOR COMPLETION OF QUESTIONNAIRE

1. Please note that your response is anonymous and will be treated in absolute confidentiality.

2. The questionnaire comprises four parts (PARTS A,B,C and D) and would take approximately 20 to 30 minutes to complete.

3. Where applicable, definitions of terms and specific assumptions are included to facilitate your response. Some general definitions have been included at the end of the questionnaire.

4. Should your department or administration wish to receive a copy of the final research report, you are welcome to write to Mr Louis P. Krüger at P.O. Box 35282, Menlo Park, 0102.

PLEASE NOTE THAT THE TERMS "DEPARTMENT" AND "ADMINISTRATION" ARE USED INTERCHANGEABLY THROUGHOUT THIS QUESTIONNAIRE

INDICATE YOUR ANSWER BY MARKING [X] IN THE APPROPRIATE BOX

PART A - GENERAL CLASSIFICATION

1.1 Please indicate the **managerial position** you currently hold in the department or administration:

- Top-level manager (directors and above) [ ]
- Middle manager (deputy and assistant directors) [ ]
- Functional manager (below assistant director) [ ]
- Other (please specify) ---------- [ ]

1.2 For **how many years** have you worked in a department of the public sector ? [ ][ ]

1.3 Please indicate your **professional status**:

- Architect [ ]
- Engineer [ ]
- Quantity surveyor [ ]
- Other (please specify) ---------- [ ]

1.4 Please indicate your **highest formal qualification**:

- Degree [ ]
- Diploma [ ]
- Other (please specify) ---------- [ ]

PART B - GENERAL ORIENTATION TO PROJECT MANAGEMENT

2.1 Is project management currently being **applied** in your department? **[Yes] [No]**

2.2 To **what extent** is project management being applied in your department?

- It is applied as an approved formal policy. [ ]
- It is applied informally but not as a formal policy. [ ]
- It is not applied either formally or informally. [ ]

2.3 Indicate the **general attitude** towards project management of ...

	POSITIVE	NEUTRAL	NEGATIVE
Your department			
Your own attitude			

2.4 Indicate your **general knowledge** of project management with regard to its ...

	GOOD	AVERAGE	LIMITED
Concepts and philosophy			
Techniques - such as PERT/CPM			

PART C - MANAGEMENT OF CHANGE

WHEN ANSWERING THE QUESTIONS IN PART C - ASSUME THAT PROJECT MANAGEMENT IS CURRENTLY NOT BEING APPLIED IN YOUR DEPARTMENT OR ADMINISTRATION

3.1 What are the **chances of successfully** implementing project management if **no changes** were made in the way the department currently operates?

- A small chance of success (0 - 24 %). [ ]
- A limited chance of success (25 - 49 %). [ ]
- A reasonable chance of success (50 - 74 %). [ ]
- A good chance of success (75 - 99 %). [ ]

3.2 How would you judge the **past performance** of your department in terms of its ...

	GOOD	AVERAGE	POOR
Meeting the department's objectives.			
Efficiently utilizing department's resources.			

3.3 Are there **disrupting forces** (either from inside or outside your department) which you believe restrain its optimal performance? **[Yes] [No]**

3.4 Should such disrupting forces be present, are some **adjustments inside** the department necessary to maintain or improve its performance? **[Yes] [No]**

3.5 Which **one** of the following provides the **greatest stimulus** for change inside your department?

- External forces - political events, economic conditions. [ ]
- Internal forces - new policies, lack of resources. [ ]

3.6 What is the **general attitude** of your department towards change?

Changes are generally	**[embraced]**	**[resisted]**
Changes are initiated	**[frequently]**	**[infrequently]**

3.7 Would implementing project management **contribute** to a solution to deal with some of the disrupting forces which affect your department? **[Yes] [No]**

3.8 How **many changes or adjustments** would be needed in order to implement project management effectively and efficiently in your department?

- Many changes would be needed. [ ]
- Some changes would be needed. [ ]
- No changes would be needed. [ ]

3.9 Should project management be implemented in your department, which of the following statements would you consider to be **true**?

- Substantial time is needed. **[True]** **[False]**
- Extensive change would be indicated. **[True]** **[False]**
- General attitude of personnel is unfavourable. **[True]** **[False]**
- Outside consultant is best to manage implementation. **[True]** **[False]**

3.10 Which of the following would have the **greatest priority** for change in order to implement project management in your department? (Indicate the order with 1 = highest priority; 2 = second priority; 3 = third priority and 4 = lowest priority)

- Functions, tasks and responsibilities of personnel. [ ]
- Control and decision procedures inside the department. [ ]
- Overall direction and objectives of the department. [ ]
- Attitudes of individuals and groups in the department. [ ]

3.11 Which of the following methods would be **most appropriate** to implement project management in your department? (Indicate the order with 1 = most appropriate; 2 = second choice; 3 = third choice and 4 = least appropriate)

■ Technological method where implementation is achieved through new equipment and techniques.	[ ]
■ Structural method where implementation is achieved through modification of organizational structure and reporting relationships.	[ ]
■ Managerial method where implementation is achieved through changes in administrative systems such as remuneration systems.	[ ]
■ Human-oriented method where implementation is achieved through education and training of personnel.	[ ]

3.12 Which of the following change policies would be the **best suited** to implement project management?

■ A policy where some of the changes which are needed are gradually phased in over an extended period.	[ ]
■ A policy where all the changes which are needed are immediately implemented in aggregate fashion.	[ ]

3.13 Which of the following strategies would be **most appropriate** to implement project management in your department? (Indicate the order with 1 = most appropriate; 2 = second choice; 3 = third choice and 4 = least appropriate)

■ Facilitative strategy (is used where personnel generally accept the need for project management but additional resources may be needed to facilitate the implementation).	[ ]
■ Informational strategy (is used where personnel do not understand why project management is necessary and information regarding the implementation needs to be conveyed to them first).	[ ]
■ Attitudinal strategy (is used where personnel have a negative outlook towards project management and their attitudes will need to be changed before implementation).	[ ]
■ Political strategy (is used where personnel will not readily accept project management and implementation will have to be forced upon them).	[ ]

3.14 Which of the following activities are the **most critical** elements for implementing project management? (Indicate the order with 1 = most critical; 2 = second most critical; 3 = least critical)

■ Feasibility study prior to implementation of project management. [ ]

■ Actual implementation of project management. [ ]

■ Supporting the implementation of project management. [ ]

3.15 Which of the following people would be **best suited** to fulfil the listed role if project management was implemented? (Indicate the order with 1 = best suited; 2 = second choice; 3 = third choice and 4 = least suited).

	Change manager	Change agent	Change target
Top-level manager			
Middle-level manager			
Functional manager			
Project manager			

The following definitions apply to this question:

Change manager is the person who generally oversees the efforts to implement project management.

Change agent is the person who designs and conducts the strategy to implement project management.

Change targets are the people who will actually implement the changes needed for project management.

3.16 Which of the following sources of resistance are the **greatest barrier** to implementing project management in your department? (Indicate the order with 1 = greatest barrier; 2 = second greatest barrier; 3 = smallest barrier)

■ Barrier to acceptance (where personnel do not believe that there is a need for project management and do not accept it being implemented).	[ ]
■ Barriers to acting (where personnel accept that there is a need for project management but do not possess the necessary skills or resources to actually implement it).	[ ]
■ Barriers to understanding (where personnel do not understand the need for or consequences of implementing project management).	[ ]

3.17 Do you think that project management as a formal policy could **easily fit in** with "the way things are done in the department" and "the way people think and act"? **[Yes] [No]**

3.18 Will the existing organizational structure in the department need to be **modified or changed** in order to accommodate implementing project management? **[Yes] [No]**

3.19 Which of the following would be the **best means** to ensure that once project management is implemented, it remains effectively and efficiently applied? (Indicate the order with 1 = best means; 2 = second choice; 3 = third best means)

- Departmental structure accommodating project management. [ ]
- Direction and support from managers in the department. [ ]
- Positive attitude and actions of personnel. [ ]

3.20 Which of the following managerial assignment positions would be the **most effective** to oversee the implementation project management? (Indicate the order with 1 = most effective; 2 = second choice; 3 = least effective)

■ Managers should be appointed from outside the department to oversee the implementation of project management.	[ ]
■ Managers within the department are used to oversee the implementation of project management.	[ ]
■ Managers within the department should be retained but new managers must be appointed to provide assistance with the implementation.	[ ]

PART D - FORCE FIELD ANALYSIS OF PROJECT MANAGEMENT

WHEN ANSWERING THE QUESTIONS IN PART D - ASSUME THAT YOUR DEPARTMENT OR ADMINISTRATION HAS DECIDED TO IMPLEMENT PROJECT MANAGEMENT AS A FORMAL POLICY (OR HAS ALREADY DONE SO) IN DIVISIONS WHICH DEAL WITH PROJECTS

4.1 Indicate the **relative importance** of the following factors which may **contribute** to the implementation of project management.

CONSULT THE KEY AT THE TOP OF EACH PAGE WHEN INDICATING YOUR ANSWER

KEY: +++ very important ++ important + desirable = not important

PHILOSOPHICAL FACTORS	+++	++	+	=
The department, as part of its normal routine, should be responsible for managing projects.				
Projects should be divided into distinct phases of development to promote the management of the different portions of the project.				
The systems approach to management, whereby the emphasis is placed on managing the entire project rather than its individual parts, should be applied to projects.				
Realistic project objectives (budget, time and specifications) should be set and achieved through the use of a management-by-objective approach.				
Project success should be clearly defined as the achievement of the project objectives with widespread participant satisfaction.				
The key project management elements consisting of a project manager, a project team and a project management system, should exist.				
A project-oriented management information and control system should be developed and utilized in the department.				
Top-level management should accept the overall responsibility for successfully implementing project management in the department.				
Top-level management should demonstrate genuine commitment to and support for the project management concept.				
Personnel should be educated and trained prior to, during and after implementation in the concepts, methods and techniques of project management.				
The core (scope, quality, time, cost) and facilitating (risk, human resources, communication, procurement) project management functions should be applied in an integrated manner.				
Possible advantages of project management such as optimization of resources, improved control, better customer relations and improved integration, should be recognised.				
Integrative planning and control is needed between different sections in the department because the consequences of failure are high such as financial loss and damage to reputation of department.				

KEY: +++ very important ++ important + desirable = not important

PHILOSOPHICAL FACTORS (CONTINUED)	+++	++	+	=
The ability to perform trade-off analysis is required in order to attain the desired performance within the constraints of time and cost.				

SITUATIONAL FACTORS	+++	++	+	=
Projects should be clearly defined, skilfully planned and effectively controlled during execution.				
The department is involved with projects which are complex and have a high degree of uncertainty.				
The department deals with a large variety of labour-intensive projects where time and cost goals are considered critical.				
The department should be sensitive to environmental influences which may impact on the progress and success of the project.				
The interests of external stakeholders such as environmentalists should be considered and accommodated when projects are undertaken.				
The department should be able to deal with projects of a large magnitude where many interdisciplinary and interdependent activities are coordinated and integrated over different functional divisions.				
The department should be able to deal with complex tasks in both slow and fast changing external environments.				
The ability to increase the strength of the driving forces of project success such as team motivation, leadership, technical expertise, and client support, is required.				
The differences in project management practice between commercial and nonprofit or government environments should be recognised.				

ORGANIZATIONAL FACTORS	+++	++	+	=
An adaptable organizational form is needed with flexible management procedures and a greater degree of decentralized decision making.				
A dynamic organizational structure, capable of rapid restructuring when changes occur, should be utilized.				

KEY: +++ very important ++ important + desirable = not important

ORGANIZATIONAL FACTORS (CONTINUED)	+++	++	+	=
A project differentiated organization which incorporates formal horizontal relations for the integration of work efforts of multiple subunits is necessary.				
A focal point for the integration of work between subunits should be established.				
The responsibility for the management of a project should be separated from the controlling influence of functional units.				
A matrix organizational structure with a traditional vertical structure combined with formal horizontal project relations should be utilized.				
Effective transitional management which entails prior planning, employee involvement and conflict resolution is needed when converting to a new project organizational structure.				
A project-driven organization which uses a matrix structure is a prerequisite.				

JOB-DIMENSIONAL FACTORS	+++	++	+	=
The project manager should be able to perform a variety of roles such as that of integrator, communicator, decision maker and motivator.				
The project manager is held accountable for the success/failure of the projects assigned.				
The principal responsibility of the project manager is to deliver the project end-item within the constraints imposed by the project objectives.				
The interface role between the project manager and both top-level and functional management should be considered a priority.				
The influence of the project manager gained from knowledge, experience, and personal relationships should supplement the lack of formal authority.				
A cohesive project team which is dedicated to the achievement of the project objectives should be established.				
The project manager should be given the authority to make final decisions, control resources and enforce compliance with requirements.				

KEY: +++ very important ++ important + desirable = not important

JOB-DIMENSIONAL FACTORS (CONTINUED)	+++	++	+	=
The commitment, cooperation and participation of all key project participants should be acquired.				
Communication and information sharing between all key project participants is required.				
A director of projects should be appointed to oversee the management of multiple projects which are undertaken simultaneously.				

HUMAN-ORIENTED FACTORS	+++	++	+	=
The project manager should display managerial proficiency by the ability to plan, organize, lead/direct and control.				
The desired personal characteristics of the project manager are adaptability, initiative, confidence, persuasiveness, and enthusiasm.				
The project manager should possess behavioral (leadership), general business (administrative) and technical skills.				
The project manager should follow a relations or people-oriented rather than a task or work-oriented leadership style.				
The project manager should lead the project team primarily through participation and delegation.				
The project participant's enjoyment and personal satisfaction through all stages of the project should. be sought and promoted.				
OTHER FACTORS YOU WOULD LIKE TO INCLUDE				

4.2 Indicate the relative importance of the following factors which may **restrain** the implementation of project management.

CONSULT THE KEY AT THE TOP OF EACH PAGE WHEN INDICATING YOUR ANSWER

KEY: +++ very restraining ++ restraining + undesirable = not important

COMBINED RESTRAINING FACTORS	+++	++	+	=
Traditional management approaches (ie. formal lines of authority, centralized control) which are applied to project-type work.				
Failures that occur through unsupportive top-level management and inappropriate selection of the project management approach.				
Possible disadvantages of project management such as more complex internal operations, lower utilization of personnel, and inconsistent application of organizational policies.				
The high tendency for conflict in project environments with regard to project schedules, priorities and resource allocations.				
The failures that occur when the user is not involved, termination is not planned, numerous changes are made, and insufficient resources are available.				
A large project office is established with too many non-sharing professional specialists assigned.				
A pure functional differentiated organization where integration is primarily achieved through formal. rules, procedures and the formal chain of command.				
A traditional functional-oriented structure is used in a project environment.				
A separate, autonomous department is created for each large project.				
The organizational restructuring which is required to convert to a project-driven matrix structure.				
The staffing complexities with a project team such as performance evaluation and consistent application of personnel policies.				
The dual reporting relationship of project team members to both a functional head and a project manager.				
Failures that occur when an unsuitable project manager is selected, the systematic nature of projects are disregarded, and when the project management techniques are misused.				
OTHER FACTORS YOU WOULD LIKE TO INCLUDE				

4.3 With reference to the answers you have provided in questions 4.1 and 4.2 - should the contributing and restraining factors be present to the degree you have indicated - what do you believe the chances are of successfully implementing formalized project management in your department?

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THANK YOU VERY MUCH FOR YOUR TIME AND MUCH APPRECIATED CONTRIBUTION!

GENERAL DEFINITIONS:

Project-type work is work that involves projects. Examples are the construction of schools, hospital and office buildings.

Project management is a formal approach to the management of projects which embodies three essential components namely a project manager, a project team and a project management system.

Contributing factor is a characteristic or condition which when present would positively contribute or facilitate the implementation of formalized project management.

Restraining factor is a characteristic or condition which when present would negatively contribute or restrain the implementation of formalized project management.

ANNEXURE B

RESEARCH QUESTIONNAIRE WITH THEORETICAL PROPOSITIONS INDICATED

PROJECT MANAGEMENT SURVEY

PREFACE

I wish to thank you for your participation in this research project. The questionnaire you are about to complete forms part of the empirical research for a doctorate in business administration. This research is being done to determine if and how formalized project management could be implemented in departments/administrations of the public sector who are involved in construction activities by which building accommodation is provided.

SUGGESTIONS FOR COMPLETION OF QUESTIONNAIRE

1. Please note that your response is anonymous and will be treated in absolute confidentiality.

2. The questionnaire comprises four parts (PARTS A,B,C and D) and would take approximately 20 to 30 minutes to complete.

3. Where applicable, definitions of terms and specific assumptions are included to facilitate your response. Some general definitions have been included at the end of the questionnaire.

4. Should your department or administration wish to receive a copy of the final research report, you are welcome to write to Mr Louis P. Krüger at P.O. Box 35282, Menlo Park, 0102.

PLEASE NOTE THAT THE TERMS "DEPARTMENT" AND "ADMINISTRATION" ARE USED INTERCHANGEABLY THROUGHOUT THIS QUESTIONNAIRE

INDICATE YOUR ANSWER BY MARKING [X] IN THE APPROPRIATE BOX

PART A - GENERAL CLASSIFICATION

NOTE: THE TERMS "DEPARTMENT" AND "ADMINISTRATION" ARE USED INTERCHANGEABLY

1.1 Please indicate the **managerial position** you currently hold in the department/administration:

- Top-level manager (directors and above) [ ]
- Middle manager (deputy and assistant directors) [ ]
- Functional manager (below assistant director) [ ]
- Other (please specify) ---------- [ ]

1.2 For **how many years** have you worked in a department of the public sector? [ ][ ]

1.3 Please indicate your **professional status**:

- Architect [ ]
- Engineer [ ]
- Quantity surveyor [ ]
- Building manager [ ]
- Other (please specify) ---------- [ ]

1.4 Please indicate your **highest formal qualification**:

- Degree [ ]
- Diploma [ ]
- Other (please specify) ---------- [ ]

PART B - GENERAL ORIENTATION TO PROJECT MANAGEMENT

2.1 Is project management currently being **applied** in your department? **[Yes] [No]**

2.2 To **what extent** is project management being applied in your department?

- It is applied as an accepted formal policy. [ ]
- It is applied informally but not as a formal policy. [ ]
- It is not applied either formally or informally. [ ]

2.3 Indicate the **general attitude** to project management of ...

	POSITIVE	NEUTRAL	NEGATIVE
Your department			
Your own attitude			

2.4 Indicate your **general knowledge** of project management with regard to its ...

	GOOD	AVERAGE	LIMITED
Concepts and philosophy			
Techniques - such as PERT/CPM			

PART C - MANAGEMENT OF CHANGE

WHEN ANSWERING THE QUESTIONS IN PART C - ASSUME THAT PROJECT MANAGEMENT IS CURRENTLY NOT BEING APPLIED IN YOUR DEPARTMENT OR ADMINISTRATION

3.1 What are the **chances of successfully** implementing project management if **no changes** were made in the way the department currently operates?

A small chance of success (0 - 24 %). [ ]

A limited chance of success (25 - 49 %). [ ]

A reasonable chance of success (50 - 74 %). [ ]

A good chance of success (75 - 99 %). [ ]

(P74) 3.2 How would you judge the **past performance** of your department in terms of its....

	GOOD	AVERAGE	POOR
Meeting the department's objectives.			
Efficiently utilizing department's resources.			

(P62) 3.3 Are there **disrupting forces** (either from inside or outside your department) which you believe restrain its optimal performance? **[Yes] [No]**

(P62) 3.4 Should such disrupting forces be present, are **some adjustments inside** the department necessary to maintain or improve its performance? **[Yes] [No]**

(P62) 3.5 Which **one** of the following do you consider provide the **greatest stimulus** for change inside your department?

- External forces - political events, economic conditions. [ ]
- Internal forces - new policies, lack of resources. [ ]

(P63) 3.6 What is the **general attitude** of your department to change?

Changes are generally	**[embraced]**	**[resisted]**
Changes are initiated	**[frequently]**	**[infrequently]**

(P61) 3.7 Would implementing project management **contribute** to a solution to deal with some of the disrupting forces which affect your department? **[Yes] [No]**

(P74) 3.8 How **many changes or adjustments** would be needed in order to
(P75) implement project management effectively and efficiently in your department?

- Many changes would be needed. [ ]
- Some changes would be needed. [ ]
- No changes would be needed. [ ]

(P66) 3.9 Should project management be implemented in your department, which of the following statements would be **true**?

- Substantial time is needed. **[True]** **[False]**
- Extensive change would be indicated. **[True]** **[False]**
- General attitude of personnel is unfavourable. **[True]** **[False]**
- Outside consultant best to manage implementation. **[True]** **[False]**

(P64) 3.10 Which of the following would have the **greatest priority** for change in order to implement project management in your department? (Indicate the order of priority with 1 = highest priority; 2 = second priority; 3 = third priority and 4 = lowest priority)

- Functions, tasks and responsibilities of personnel. [ ]
- Control and decision procedures in the department. [ ]
- Overall direction and objectives of the department. [ ]
- Attitudes of individuals and groups in the department. [ ]

(P65) 3.11 Which of the following methods would be **most appropriate** to implement project management in your department? (Indicate your order of preference with 1 = most appropriate; 2 = second choice; 3 = third choice and 4 = least appropriate)

■ Technological method where implementation is achieved through new equipment and techniques.	[ ]
■ Structural method where implementation is achieved through modification of organizational structure and reporting relationships.	[ ]
■ Managerial method where implementation is achieved through changes in administrative systems such as remuneration systems.	[ ]
■ Human-oriented method where implementation is achieved through education and training of personnel.	[ ]

(P70) 3.12 Which of the following change policies would be the **best suited** to implement project management?

■ A policy where some of the changes which are needed are gradually phased in over an extended period.	[ ]
■ A policy where all the changes which are needed are immediately implemented in aggregate fashion.	[ ]

(P67) 3.13 Which of the following strategies would be **most appropriate** to implement project management in your department? (Indicate your order of preference with 1 = most appropriate; 2 = second choice; 3 = third choice and 4 = least appropriate)

■ Facilitative strategy (personnel generally accept the need for project management but additional resources may be needed to facilitate the implementation).	[ ]
■ Informational strategy (personnel do not understand why project management is necessary and information regarding the implementation needs to be conveyed first).	[ ]
■ Attitudinal strategy (personnel have a negative outlook to project management and their attitudes will need to be changed before implementation).	[ ]
■ Political strategy (personnel will not readily accept project management and implementation will have to be forced upon them).	[ ]

(P71) 3.14 Which of the following activities are the **most critical** elements for implementing project management? (Indicate the order of importance with 1 = most important; 2 = second choice; 3 = least important)

■ Feasibility study prior to implementation of project management. [ ]

■ Actual implementation of project management. [ ]

■ Supporting the implementation of project management. [ ]

(P68) 3.15 Which of the following people would be **best suited** to fulfil the listed role or position if project management was implemented? (Indicate your order of preference with 1 = best suited; 2 = second choice; 3 = third choice and 4 = least suited).

	Change manager	Change agent	Change target
Top-level manager			
Middle-level manager			
Functional manager			
Project manager			

The following definitions apply to this question:

Change manager is the person who generally oversees the efforts to implement project management.

Change agent is the person who designs and conducts the strategy to implement project management.

Change targets are the people who will actually implement the changes needed for project management.

(P69) 3.16 Which of the following sources of resistance are the **greatest barrier** to implementing project management in your department? (Indicate the order of importance with 1 = most important; 2 = second choice; 3 = least important)

■ Barrier to acceptance (personnel do not believe that there is a need for project management and do not accept it being implemented).	[ ]
■ Barriers to acting (personnel accept that there is a need for project management but do not possess the necessary skills or resources to actually implement it).	[ ]
■ Barriers to understanding (personnel do not understand the need for or consequences of project management).	[ ]

(P75) 3.17 Do you think that project management as a formal policy could easily fit in with "the way things are done in the department" and "the way people think and act"? **[Yes]** **[No]**

(P73) 3.18 Will the existing organizational structure in the department need to be **modified or changed** in order to accommodate implementing project management? **[Yes] [No]**

(P72) 3.19 Which of the following would be the **best means** to ensure that once project management is implemented, it remains effectively and efficiently applied? (Indicate the order of importance with 1 = most important; 2 = second choice; 3 = least important)

- Departmental structure accommodating project management. [ ]
- Direction and support from managers in the department. [ ]
- Positive attitude and actions of personnel. [ ]

(P74) 3.20 Which of the following managerial assignment positions would be the **most effective** to oversee the implementation project management? (Indicate the order with 1 = most effective; 2 = second choice; 3 = least effective)

■ Managers should be appointed from outside the department to oversee the implementation of project management.	[ ]
■ Managers within the department are used to oversee the implementation of project management.	[ ]
■ Managers within the department should be retained but new managers must be appointed to provide assistance with the implementation.	[ ]

PART D - FORCE FIELD ANALYSIS OF PROJECT MANAGEMENT

WHEN ANSWERING THE QUESTIONS IN PART D - ASSUME THAT YOUR DEPARTMENT OR ADMINISTRATION HAS DECIDED TO IMPLEMENT PROJECT MANAGEMENT AS A FORMAL POLICY (OR HAS ALREADY DONE SO) IN DIVISIONS WHICH DEAL WITH PROJECTS

4.1 Indicate the **relative importance** of the following factors which may **contribute** to the implementation of project management.

CONSULT THE KEY AT THE TOP OF EACH PAGE

KEY: +++ very important ++ important + desirable = not important

PHILOSOPHICAL FACTORS	+++	++	+	=
The department, as part of its normal routine, should be responsible for managing projects **(P1)**.				
Projects should be divided into distinct phases of development to promote the management of the different portions of the project **(P3)**.				
The systems approach to management, whereby the emphasis is placed on managing the entire project rather than its individual parts, should be applied to projects **(P6)**.				
Realistic project objectives (budget, time and specifications) should be set and achieved through the use of a management-by-objective approach **(P8)**.				
Project success should be clearly defined as the achievement of the project objectives with widespread participant satisfaction **(P47)**.				
The key project management elements consisting of a project manager, a project team and a project management system, should exist **(P9)**.				
A project-oriented management information and control system should be developed and utilized in the department **(P41)**.				
Top-level management should accept the overall responsibility for successfully implementing project management in the department **(P25)**.				
Top-level management should demonstrate genuine commitment to and support for the project management concept **(P39)**.				
Personnel should be educated and trained prior to, during and after implementation in the concepts, methods and techniques of project management **(P36)**.				
The core (scope, quality, time, cost) and facilitating (risk, human resources, communication, procurement) project management functions should be applied in an integrated manner **(P38)**.				
Possible advantages of project management such as optimization of resources, improved control, better customer relations and improved integration, should be recognised **(P55)**.				
Integrative planning and control is needed between different sections in the department because the consequences of failure are high such as financial loss and damage to reputation of department **(P58)**.				

KEY: +++ very important ++ important + desirable = not important

PHILOSOPHICAL FACTORS (CONTINUED)	+++	++	+	=
The ability to perform trade-off analysis is required in order to attain the desired performance within the. constraints of time and cost **(P46)**.				

SITUATIONAL FACTORS	+++	++	+	=
Projects should be clearly defined, skilfully planned and effectively controlled during execution **(P53)**.				
The department is involved with projects which are complex and have a high degree of uncertainty **(P2)**.				
The department deals with a large variety of labour-intensive projects where time and cost goals are considered critical **(P34)**.				
The department should be sensitive to environmental influences which may impact on the progress and success of the project **(P43)**.				
The interests of external stakeholders such as environmentalists should be considered and accommodated when projects are undertaken **(P44)**.				
The department should be able to deal with projects of a large magnitude where many interdisciplinary and interdependent activities are coordinated and integrated over different functional divisions **(P57)**.				
The department should be able to deal with complex tasks in both slow and fast changing external environments **(P59)**.				
The ability to increase the strength of the driving forces of project success such as team motivation, leadership, technical expertise, and client support, is required **(P54)**.				
The differences in project management practice between commercial and nonprofit or government environments should be recognised **(P45)**.				

ORGANIZATIONAL FACTORS	+++	++	+	=
An adaptable organizational form is needed with flexible management procedures and a greater degree of decentralized decision making **(P4)**.				
A dynamic organizational structure, capable of rapid restructuring when changes occur, should be utilized **(P26)**.				

KEY: +++ very important ++ important + desirable = not important

ORGANIZATIONAL FACTORS (CONTINUED)	+++	++	+	=
A project differentiated organization which incorporates formal horizontal relations for the integration of work efforts of multiple subunits is necessary **(P28)**.				
A focal point for the integration of work between subunits should be established **(P30)**.				
The responsibility for the management of a project should be separated from the controlling influence of functional units **(P31)**.				
A matrix organizational structure with a traditional vertical structure combined with formal horizontal project relations should be utilized **(P33)**.				
Effective transitional management which entails prior planning, employee involvement and conflict resolution is needed when converting to a new project organizational structure **(P37)**.				
A project-driven organization which uses a matrix structure is a prerequisite **(P60)**.				

JOB-DIMENSIONAL FACTORS	+++	++	+	=
The project manager should be able to perform a variety of roles such as that of integrator, communicator, decision maker and motivator **(P10)**.				
The project manager is held accountable for the success/failure of the projects assigned **(P24)**.				
The principal responsibility of the project manager is to deliver the project end-item within the constraints imposed by the project objectives **(P11)**.				
The interface role between the project manager and both top-level and functional management should be considered a priority **(P12)**.				
The influence of the project manager gained from knowledge, experience, and personal relationships should supplement the lack of formal authority **(P13)**.				
A cohesive project team which is dedicated to the achievement of the project objectives should be established **(P19)**.				
The project manager should be given the authority to make final decisions, control resources and enforce compliance with requirements **(P40)**.				

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JOB-DIMENSIONAL FACTORS (CONTINUED)	+++	++	+	=
The commitment, cooperation and participation of all key project participants should be acquired **(P51)**.				
Communication and information sharing between all key project participants is required **(P52)**.				
A director of projects should be appointed to oversee the management of multiple projects which are undertaken simultaneously **(P23)**.				

HUMAN-ORIENTED FACTORS	+++	++	+	=
The project manager should display managerial proficiency by the ability to plan, organize, lead/direct and control **(P7)**.				
The desired personal characteristics of the project manager are adaptability, initiative, confidence, persuasiveness, and enthusiasm **(P14)**.				
The project manager should possess behavioral (leadership), general business (administrative) and technical skills **(P15)**.				
The project manager should follow a relations or people-oriented rather than a task or work-oriented leadership style **(P16)**.				
The project manager should lead the project team primarily through participation and delegation **(P17)**.				
The project participant's enjoyment and personal satisfaction through all stages of the project should be sought and promoted **(P42)**.				
OTHER FACTORS YOU WOULD LIKE TO INCLUDE				

4.2 Indicate the relative importance of the following factors which may **restrain** the implementation of project management.

CONSULT THE KEY AT THE TOP OF EACH PAGE WHEN INDICATING YOUR ANSWER

KEY: +++ very restraining ++ restraining + undesirable = not important

COMBINED RESTRAINING FACTORS	+++	++	+	=
Traditional management approaches (ie. formal lines of authority, centralized control) which are applied to project-type work **(P5)**.				
Failures that occur through unsupportive top-level management and inappropriate selection of the project management approach **(P48)**.				
Possible disadvantages of project management such as more complex internal operations, lower utilization of personnel, and inconsistent application of organizational policies **(P56)**.				
The high tendency for conflict in project environments with regard to project schedules, priorities and resource allocations **(P18)**.				
The failures that occur when the user is not involved, termination is not planned, numerous changes are made, and insufficient resources are available **(P50)**.				
A large project office is established with too many non-sharing professional specialists assigned **(P20)**.				
A purely functionally differentiated organization where integration is primarily achieved through formal rules, procedures and the formal chain of command **(P27)**.				
A traditional functional-oriented structure is used in a project environment **(P29)**.				
A separate, autonomous department is created for each large project **(P32)**.				
The organizational restructuring which is required to convert to a project-driven matrix structure **(P35)**.				
The staffing complexities with a project team such as performance evaluation and consistent application of personnel policies **(P21)**.				
The dual reporting relationship of project team members to both a functional head and a project manager **(P22)**.				
Failures that occur when an unsuitable project manager is selected, the systematic nature of projects are disregarded, and when the project management techniques are misused **(P49)**.				
OTHER FACTORS YOU WOULD LIKE TO INCLUDE				

4.3 With reference to the answers you have provided in questions 4.1 and 4.2 - should the contributing and restraining factors be present to the degree you have indicated - what do you believe the chances are of successfully implementing formalized project management in your department?

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