THE DEVELOPMENT OF AN ASSESSMENT TOOL FOR MEASURING PROJECT MANAGEMENT CULTURE IN ORGANISATIONS

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Submitted in partial fulfillment of the requirements for the degree

Ph.D: ORGANIZATIONAL BEHAVIOUR in the
DEPARTMENT OF HUMAN RESOURCES MANAGEMENT,
FACULTY OF ECONOMICS AND MANAGEMENT SCIENCES.

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23 October 2003

DECLARATION

I, Yvonne du Plessis declare that "*The development of an assessment tool for measuring project management culture in organisations*" is my own work and that the views and opinions expressed in this work are those of the author and relevant literature references as shown in the reference list.

I further declare that the content of this thesis is and will not be handed in for any other qualification at any other tertiary institution.

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FULL NAME AND SURNAME DATE

ACKNOWLEDGEMENTS

It is absolutely impossible for anyone to complete a doctoral thesis without the assistance and support of others.

My sincerest gratitude and appreciation to the following people and institutions for their assistance and support:

- The National Research Foundation (NRF) for a study grant.
- Ms Idette Noome from the Department of English at the University of Pretoria for editing the thesis.
- Ms Rina Owen from the Department of Statistics at the University of Pretoria, for her assistance with the statistical analysis, especially the factor analysis of the research data.
- My study leader, Prof. Crystal Hoole, for believing in my abilities and allowing me to be creative in my thoughts and approach.
- My dearest husband, Danie, and daughter, Michelle, who had to endure many nights and weekends without my companionship.
- My loving and caring parents who both passed away during my studies, have always encouraged me to believe in myself and at the same time to be humble.
- My creator who gave me the ability and perseverance to complete the study.

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ABSTRACT

THE DEVELOPMENT OF AN ASSESSMENT TOOL FOR MEASURING PROJECT MANAGEMENT CULTURE IN ORGANISATIONS

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The principles and practices of project management are increasingly adopted by organisations (technical and non-technical) that hope to reap its multiple benefits, particularly 'the opportunity to be both externally effective (fast to market) and internally efficient (doing more, faster, with less)' (Pinto, 2002).

Organisations may not be as successful as they anticipated when they opted to engage in project management, because their organisational culture does not support project work.

The primary objective of this research was *'to develop a reliable holistic diagnostic assessment tool to measure project management culture, as an operational culture, in organisations'.*

This research made use of multi-methods (triangulation) including:

- a thorough literature study;
- verification of the theoretical model of du Plessis (2001) by project management experts using Lawshe's (1975) technique;

- the development of a scale instrument (project management culture assessment tool) by using DeVellis's (1991) process supported by Clark and Watson's (1995); and
- a reliability test of the developed project management culture assessment tool (PMCAT), by using the Mann-Whitney t-test, in two independent organisations.

The results indicated that 94% of the project management experts who responded perceived the model and descriptive elements on project management culture by Du Plessis (2001) as valid.

A questionnaire with 135 variables derived from the validated model and descriptive elements was subjected to 494 project managers of whom 236 responded. This data was the input to the development of the scale instrument, using statistical techniques such as item analysis (SAS, 1997) and exploratory factor analysis (BMDP, 1993). The outcome was a project management culture assessment tool (PMCAT) that comprised of 89 items in a five-factor scale instrument. The overall reliability of the items in this scale was highly acceptable with a Cronbach alpha coefficient above 0.70. The scale inter-correlation showed that the factors are highly inter-correlated which can be expected from an interdisciplinary, holistic construct of factors that are systemic in nature.

The PMCAT was tested in two independent organisations and was found to be a reliable diagnostic tool that can distinguish between organisations' project management culture, especially in the South African project management environment.

Key words:

Project management, projects, project management culture, organisational culture, culture assessment, scale development.

CHAPTER 1

THE PROBLEM AND ITS CONTEXT

If a man will begin with certainties, he shall end in doubts; but if he will be content to begin with doubts he shall end in certainties.

Sir Francis Bacon (1561-1626)

1.1 INTRODUCTION

Organisations continuously search for more effective approaches in order to survive, to maintain their operations and to grow in an ever-changing and competitive environment. To achieve sustainable business results, organisations must actively manage cost, quality and product or service features by means of their efficient and effective application of managerial and operational systems (Galbraith & Lawler, 1998:2). The practice of project management, which focuses mainly on the principles of cost, time and performance quality can provide this capability (Pinto, 2002). Since the beginning of the 1990's there has been an increased focus in project management literature and on the role of projects in bringing about beneficial change to an organisation (Cooke-Davies, 2002; Dinsmore, 1999).

Cooke-Davies (2002) emphasises that different kinds of project undertaken by various organisations show that there are both direct and indirect links between project success and corporate success. Hence, the growing interest in project management as a managerial approach. This interest is evident not only in traditional technically based (hard-side) organisations, but also in non-technical (soft, process-side) organisations (Gray & Larson, 2000; Pinto, 2002). The principles and practices or methodology of project management are thus adopted by organisations that hope to reap its multiple benefits, particularly 'the opportunity to be both externally effective (fast to market) and internally efficient (doing more, faster, with less)' (Pinto, 2002). This may be the reason why Pinto, (1998) describes project management as a 'philosophy and technique-based process that can maximise potential within

the constraints of limited resources, offering a logical and attractive method for increasing profitability in a business'. Gray and Larson (2000:473) state that the twenty-first century should be the 'Golden Age' for project management, while Knutson (2001) maintains that we are 'now entering the Age of Project Management'.

There is some realisation in most organisations that employees, in addition to working on a business process, also need to lead or participate in one or more projects (Martin & Tate, 1998:58). Organisations that have not traditionally been involved in projects are increasingly turning to project management without fully understanding its underlying philosophy, principles and practices. This 'project management rush' by organisations of all kinds results in a situation where many organisations are faced with the dilemma of not doing as well as they had anticipated. Projects fail daily and cost organisations money, directly and indirectly (Pinto & Kharbanda, 1996), and often they do not know what the causes for their losses and failures are.

One of the causes of project failure is that the organisational culture in which these projects have to deliver results is not supportive of project work (Cleland, 1988; Gray & Larson, 2000; Wang, 2001). The overall organisational environment, as an operational culture, should in fact be supportive of project principles and practices, otherwise projects cannot succeed optimally (Graham & Englund, 1997).

In this context it is evident that project work is often attempted in organisations without any clear understanding or application of project management philosophy, principles and practices. Thus, a supportive organisational culture is not created to ensure optimal project performance and thus business performance.

1.2 THE RESEARCH PROBLEM AND ITS SIGNIFICANCE

Du Plessis (2001) argues that a project management culture is vital for project success and that projects are in their turn key building blocks in the design and implementation of business strategies. Gray and Larson (2000:15) acknowledge that 'project managers must shape a project culture that stimulates teamwork and high levels of personal motivation as well as a capacity to quickly identify and resolve problems that threaten project work'.

Organisations that engage in project work may not be as successful as they anticipated when they opted to engage in project management and to apply a project management methodology, because their organisational culture does not support project work.

The literature and research conducted in this field is limited and focus mainly on sub-sections of project management culture, such as a project manager's professional culture (Wang, 2001), project team culture (Gray & Larson, 2000), or a supportive project environment (Graham & Englund, 1997).

Since project management is by nature systemic and consists of interdependent parts (Kerzner, 1997), an assessment of a project management culture in organisations should view such a culture as a holistic phenomenon, inclusive of strategies, structures, systems, processes, people's behaviour and the environment. Therefore the *specific research problem* that necessitates this study is *the lack of a holistic assessment tool to measure project management culture as an operational culture in organisations.*

The availability of such an assessment tool would enable organisations to assess or diagnose their present organisational culture's readiness for project

work. If such a tool does not focus on a particular industry or nationality, but on the organisation as a holistic operational entity which has to perform in an open system, such a tool could be used generically.

The results of this study will expand the body of knowledge on project management and serve as a valuable contribution to the research base of the interdisciplinary fields of project management and organisational behaviour. An assessment tool of the current project management culture (an operational culture supportive of successful projects) as well as an informative (diagnostic) tool and a development tool to identify the areas for improvement to create a project management culture for project success is created. The results of the study should enable organisations to identify gaps in their organisational culture and facilitate actions to improve the situation, thereby optimising project work for continuous business improvement.

1.3 DEMARCATION AND SCOPE OF THE RESEARCH

This research focuses on *developing a holistic assessment tool to measure project management culture* that can be used in any organisation to measure how supportive its organisational culture is of project work. It is thus a generic diagnostic assessment tool of organisational culture pertaining to project work gauging the internal and external perspective of the organisation as an open system.

This assessment tool does not focus on a specific culture (as per project) or any sub-system of the project or organisation *per se.* Figure 1.1 sets out the scope of the research.

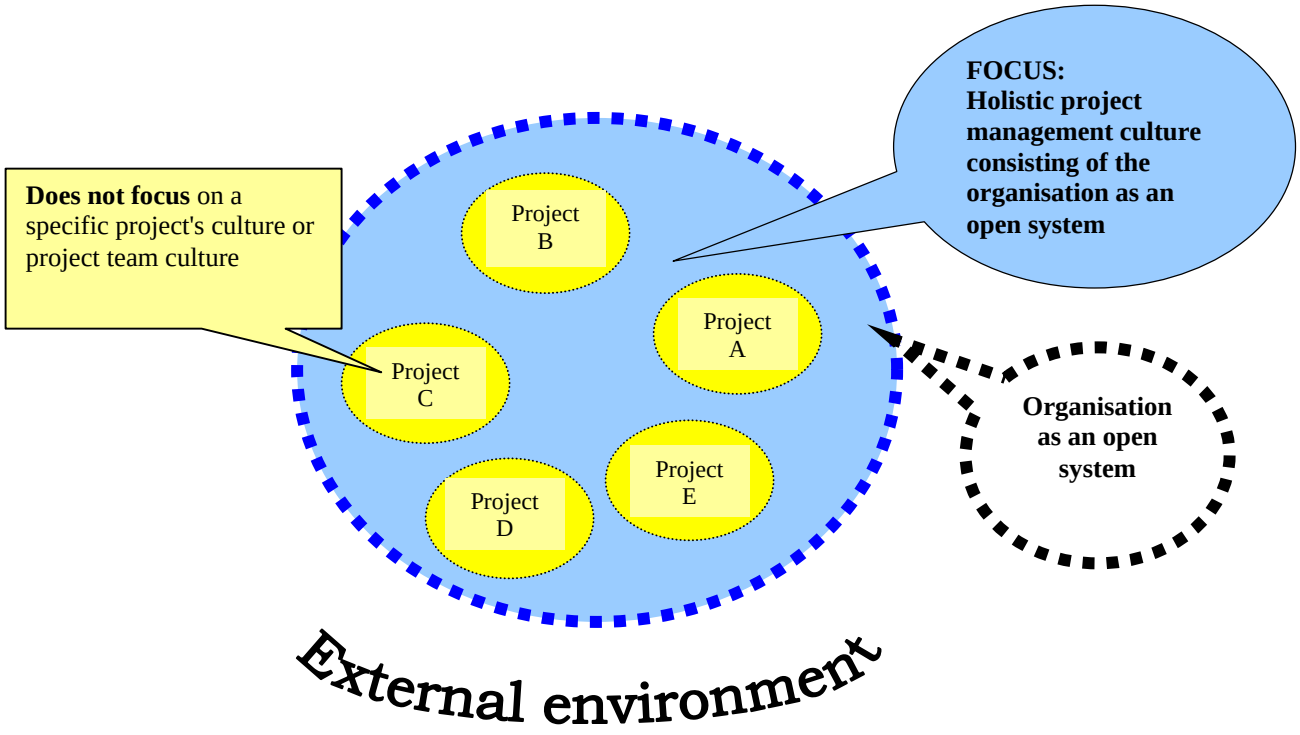

Figure 1.1: The scope of the research

1.4 THE OBJECTIVES OF THE RESEARCH

Since the main focus of this research is the development of a diagnostic assessment tool to measure project management culture in organisations, the *primary objective* is to *develop a reliable holistic diagnostic assessment tool to measure project management culture, as an operational culture, in organisations. (The term 'reliable' in this instance refers to the ability of the assessment tool to differentiate between organisations.)*

To facilitate the research process, the following research questions had to be answered (they can be regarded as sub-objectives that support the primary objective):

- *Is a project management culture, as an operational organisational culture, able to contribute towards business success in organisations that use project work?*

- *Do businesses regard the measurement of organisational culture and project management culture as necessary or value-adding to business?*

- *What should a supportive organisational culture for optimal project success consist of ? (What are the components/ elements of a project management culture?)*

- *How should organisations (those currently engaged in and those that want to apply project work) assess their project management culture?*

- *What process should be used to develop a holistic organisational culture assessment tool that can be used to assess the project management culture (as an operational culture) in organisations?*

In order to address these research objectives and provide answers to these questions, a thorough literature study in the multi-disciplinary fields of Project Management and Organisational Behaviour, was done to include the following (see Chapter 2):

- project management, projects and project success factors
- organisational culture and project management culture
- assessment of organisational culture and measurement tools
- development of an organisational culture assessment tool

The research methodology and method are discussed in Chapters 3 and 4.

- The rationale for the methodology used in the study is provided based on the literature and previous research, and is presented in Chapter 3.

- Chapter 4 elaborates on the research method and actual procedure of the research conducted.

Results and findings, with the statistical analysis, are discussed in Chapter 5. Chapter 6 provides the conclusion of the study, reflecting on the study, and making recommendations for further research.

CHAPTER 2

LITERATURE STUDY

Knowledge is of two kinds. We know a subject ourselves, or we know where we can find information on it.

Samuel Johnson (1709-1784),

***quoted in* Boswell's Life of Johnson**

2.1 INTRODUCTION

This study was conducted in the multi-disciplinary fields of Project Management and Organisational Behaviour. Relevant literature has therefore been reviewed from the following multi-disciplinary areas pertaining to the research problem, objectives and questions (set out in Chapter 1):

- project management, projects and project success factors
- organisational culture and project management culture
- assessment of organisational culture and measurement tools
- development of an organisational culture assessment tool

Figure 2.1 sets out the literature fields that have been researched to obtain a better understanding of the contextual framework of the study and to provide some of the answers to the research questions.

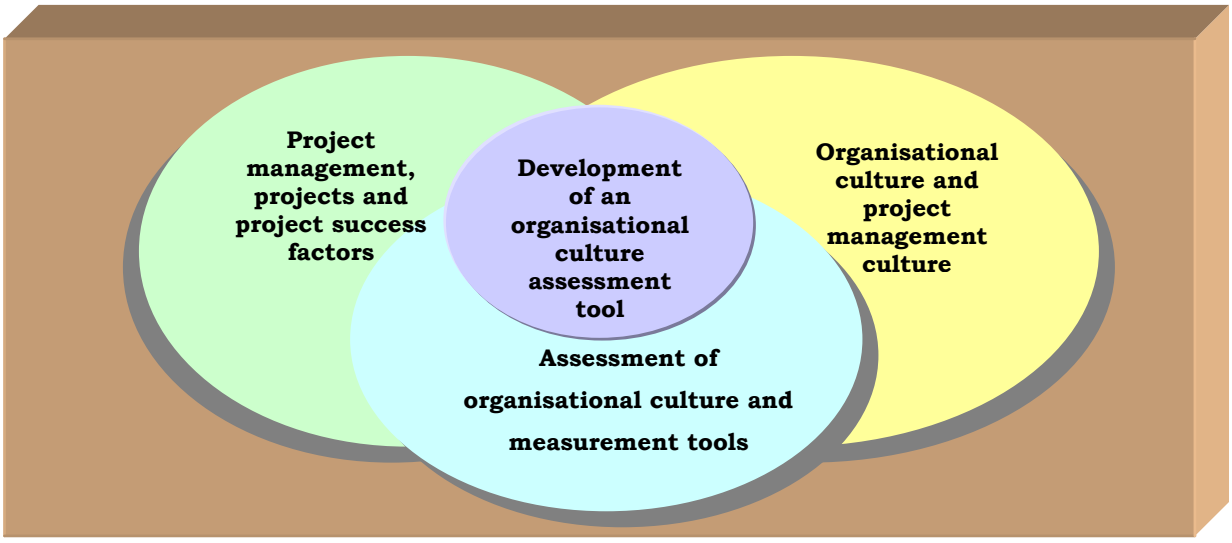

Figure 2.1: Areas of literature researched

2.2 DEFINITION OF KEY CONCEPTS

Definitions of key concepts are provided below to clarify their meaning in this research.

2.2.1 Definition of a 'Project'

Projects can be defined in various ways. The Oxford English Dictionary defines a project as '*something projected or proposed for execution; a plan, scheme, purpose; a proposal'.*

The definition of a project used in this study is a combination of definitions by Baguley (1999:10), Turner (1993:14), Nicholas (1997) and Kerzner (1997).

A *project* is a sequence of connected events, with a definite start and end, that is a unique scope of work targeted towards generating a well-defined outcome, undertaken in an organisation to achieve beneficial change. It therefore carries considerable uncertainty and risk that requires the integration of the organisation and is subject to constraints of time, cost and quality of performance.

2.2.2 Definition of 'Project Management'

Project Management is the *process* by which a project is brought to a successful conclusion. It should have three dimensions (Turner, 1993):

- *clear objectives* that, describe the project scope; are linked to an organisation and are quality, cost and time oriented
- *a management processes* inclusive of planning, organising, implementing and controlling.
- *address all the organisational levels:* strategic and tactical.

Thus *project management* refers to the planning, organisation, leading and controlling of clearly aligned project goals at all levels of the organisation to ensure customer satisfaction in the results delivered.

2.2.3 Definition of 'Organisational Culture'

Organisational Culture is a popular but elusive concept that has been variously defined as:

- a pattern of *'basic assumptions'* developed as the group or organisation learns to cope with its environment (Schein, 1985);
- a system of publicly and collectively accepted '*meanings*' which operate for a group at a particular time (Trice & Beyer, 1984);
- *'the way we do things around here'* (Deal & Kennedy, 1982; Silvester *et al.,* 1999).

Chell (1994) gives an *operational definition* of culture which suggests that culture comprises of three categories of beliefs:

- beliefs about how employees should be treated and the opportunities afforded them;
- beliefs about professionalism and support of efforts to do a good job;
- beliefs about how the organisation interfaces with the environment and strives to accomplish its mission.

The definition of Deal and Kennedy (1982) of organisational culture as '*the way we do things around here',* is the basic theoretical definition adopted in this study, and is complemented by the operational definition of Chell (1994) cited above.

2.2.4 Definition of 'Project Management Culture'

Du Plessis (2001) has developed both a narrow (parochial) and broad (pragmatic) definition of project culture.

A *narrow definition* of the concept project culture, is that a project culture is '*the way the project team does projects in their project environment*'**.** This definition may only reflect the internal, project specific environment and does not emphasise the essence of behaviour, the project character or descriptive elements.

An enhanced narrow definition, reflecting behaviour, the project character and description, has also been formulated by Du Plessis (2001). This definition is inclusive of the total (internal and external) environment. According to this definition, a *project management culture* is '*the disciplined implementation of an integrated project management approach* (the way) *by a competent and committed project team* (we) *creating unique deliverables, faster, cheaper and better than competitors, according to customer requirements and specifications* (do things)*, in a changing and competitive environment* (around here)'.

Du Plessis (2001) believes that a narrow definition does not do sufficient justice to the complexity of projects and project management and the elements involved in a project environment.

A broad definition of the concept is more functional and operationally useful, because it can be adapted to suit the specific needs of a particular organisation and the type of project undertaken.

A *broad definition* of the concept project management culture is more flexible in its application, provided the essence of projects and project management are reflected in the culture of the organisation as a whole, or in the part of the organisation where projects are effected. Du Plessis (2001) developed a framework (see figure 2.2), containing guiding principles and descriptive elements as a basis for a broad descriptive definition.

(Figure 2.2, overleaf)

ORGANISATIONAL CULTURE	PROJECT CULTURE GUIDELINES	CATEGORIES OF DESCRIPTIVE ELEMENTS
THE WAY	The **project process** or approach (HOW) ⇒ Project life-cycle	**Process** elements: ⇒ Integrated process ⇒ Systemic nature ⇒ Phases according to the project life-cycle ⇒ Definite start and end ⇒ Speed of delivery ⇒ Disciplined and controlled ⇒ Customer-oriented ⇒ Results-oriented ⇒ Beneficial change ⇒ Continuous improvement and learning
WE	The **People**: The Project Team and stakeholders (WHO and for WHOM) ⇒ Top management ⇒ Sponsor/owner ⇒ Line manager ⇒ Project leader and team ⇒ Customer/user ⇒ Supplier ⇒ Contractor ⇒ Government This includes behavioural aspects.	**People** elements: ⇒ Mindset ✓ Results-oriented ✓ Disciplined ✓ Flexible paradigm ✓ Team-player ✓ Learning affinity ✓ Change readiness ✓ Risk-oriented ⇒ Competent ⇒ Committed ⇒ Interdependence ⇒ Trusting and trustworthy ⇒ Ethical ⇒ Sound interpersonal relations ⇒ Open communication ⇒ Conflict management ⇒ Calculated risk-taking

Figure 2.2 continued

ORGANISATIONAL CULTURE	PROJECT CULTURE GUIDELINES	CATEGORIES OF DESCRIPTIVE ELEMENTS
DO THINGS	**Project Management Methodology** (WHAT)	**Structure and System** elements ⇒ Project plan ⇒ Communication plan ⇒ Work breakdown structure ⇒ Clear roles, responsibilities and accountability ⇒ Interdependence/ networking ⇒ Team approach ⇒ Shared leadership ⇒ Risk management ⇒ Flexible boundaries ⇒ Temporary structure ⇒ Specifications ⇒ Deadlines, milestones ⇒ Measurement and control ⇒ Learning
AROUND HERE	The **project environment** (WHERE) ⇒ Internal (in project team) ⇒ External (Organisation and wider)	**Environmental** elements 1) Strategic emphasis 2) Upper management support 3) Project planning support 4) Customer/end-user input 5) Project team development 6) Project execution support 7) Communication and information systems 8) Organisational support (Graham & Englund, 1997)

Figure 2.2: Broad descriptive definition of the concept Project Management Culture (adapted from Du Plessis, 2001)

In defining the concept project management culture, one should guard against a restrictive definition. Therefore, guiding principles and elements are more effective in ensuring a better understanding. However, both narrow

and broad definitions should add value to the understanding of the concept (Du Plessis, 2001).

2.2.5 Definition of 'Project Success Factor'

Project success factors are those inputs to the project management system that lead directly or indirectly to the success of the project or business (Cooke-Davies, 2002). For the purposes of this study, the term refers to factors that lead to project success and project management success. De Wit (1988) distinguishes between *project success* (measured against the overall objectives of the project) and *project management success* (measured against the common and traditional measures of performance in terms of cost, time and quality.)

2.2.6 Definition of 'Assessment Tool'

Webster's dictionary (1998) defines the concepts 'assessment' and 'tool' as follows:

> 'An *assessment* is a valuation made by authorized persons according to their discretion, ...for the purpose of fixing ...'
>
> 'A *tool* is something used in the performance of an operation or an instrument'.
>
> Therefore, an *assessment tool* for the purposes of this study, is a diagnostic instrument developed through a scientific process for the purpose of evaluating/diagnosing a project management culture as the operational culture of an organisation doing project work.

2.3 PROJECTS, PROJECT MANAGEMENT AND PROJECT SUCCESS FACTORS

Projects, project management and project success factors are described below to clarify the context and framework of this multi-disciplinary field and the key elements of a project management environment.

2.3.1 Projects

A project is a process, in other words, mechanism that enables an organisation or individuals to focus resources and abilities towards desired outcomes and thus enabling an organisation or individual to respond quickly to the desires of customers (Baguley, 1999:4).

According to Martin and Tate (1998:59), there are only two ways in which work gets done in organisations: through business processes or through projects. Business processes are permanent work structures that transform inputs into repetitive outputs. They can be viewed as on-going operations (Kerzner, 1997:2). Projects, on the other hand, are temporary work structures that transform inputs into unique outputs. Projects start up, produce whatever they have been commissioned to produce, and then shut down.

According to Kerzner (1997:71), there are four categories of project:

- individual projects (these are short in duration, and are normally assigned to an individual);
- staff projects (they can be achieved by one organisational unit).
- special projects (they require the assignment of a primary function or authority on a temporary basis to other individuals or units), and

- matrix or aggregate projects (they require input from a large number of functional units and usually control vast resources.

Projects may differ with regard to the approach to the project. A project can be more specific (hard project) with clear (tangible) results, as in engineering, or it can be less specific (soft projects) with less clear (intangible) results, as in human resources. However, from the literature, it seems that all the projects have the same basic underlying characteristics as described earlier (see the definition).

2.3.2 Project Management

Project management can mean different things to different people. Therefore the meaning has to be clarified for the purposes of this study. An understanding of the underlying principles of project management can facilitate the identification of project management culture elements. Areas that need further clarification to indicate the systemic and holistic nature of project management are

- the interdependencies in project management;
- the project management approach; and
- the project lifecycle.

2.3.2.1 Project management interdependencies

One of the characteristics that distinguish project management from general management is the sheer breadth and complexity of the relationships that need to be managed. Project success depends on the co-operation of a wide range of individuals, many of whom do not directly report to the respective

project manager. To be effective, a project manager must understand how these individuals or groups, often referred to as project stakeholders, can affect the project. Methods for managing this interdependency are thus crucial for success. The organisational culture must also allow this interdependence to take place. The nature of the interdependencies has been described by Gray and Larson (2000). Weirauch (1996) refers to these interdependencies as 'alliances' and Mead (2001) refers to it a 'networks' that are vital for project success.

Project stakeholders are individuals and organisations that are actively involved in the project, or whose interests may be positively or negatively affected as a result of project implementation or successful project completion. The main stakeholders and their interdependence in the project environment are listed and briefly described below.

- The core *project team* is responsible for managing and completing project work. Most participants want to do a good job, but they often have other obligations (if they work in a matrix or temporary structure), and they are concerned about how their involvement in the project could contribute to their reaching their personal goals and aspirations.

- *Project managers* naturally compete with each other for resources and the support of top management. At the same time, they often have to share resources and exchange information.

- *Customers define the scope of the project*, and ultimate project success depends on their being satisfied. Project managers need to be responsive to changing customer needs and requirements and need to meet customer expectations. Customers are primarily concerned with

getting a good deal and this naturally results in tension between customers and the project team.

- *Administrative support* groups, such as the human resources, information systems, procurement, finances, and maintenance functions in an organisation provide valuable support services. At the same time they impose constraints on and set requirements for the project, such as the documentation of expenditures and the timely and accurate delivery of information.

- *Functional managers*, depending on how the project is organised, can play a minor or a major role in project success. In matrix structures, they may be responsible for assigning project personnel, resolving technical dilemmas, and overseeing the completion of significant segments of the project work. Even in dedicated project teams, technical input from functional managers may be useful, and manager's acceptance of completed project work may be critical to in-house projects. Functional managers usually want to co-operate up to a point, but only up to a point. They are also concerned with preserving their status within the organisation and minimising the disruptions the project may cause to their own operations.

- *Top management* approves funding and the allocation of resources to the project. They establish priorities within the organisation as part of strategic planning and determine the strategic importance of the project. They define success and adjudicate rewards for accomplishments. Significant adjustments in a project's budget, scope and schedule typically need their approval. They have a natural vested interest in the success of the project, but at the same time have to be responsible in deciding what is best for the entire organisation.

- *Project sponsors* champion the project and use their influence to gain approval of the project. Their reputation is tied to the success of the project, and they need to be kept informed of any important developments. They defend the project when it comes under attack and are key project allies.

- *Sub-contractors*, in some cases, may do all the actual work. In that case the project team merely co-ordinating their contributions. In other cases, they are responsible for ancillary segments of the project scope. Poor work and schedule delays can affect the work of the core project team. While contractors' reputations depends on their doing good work, they must balance their contributions with their own profit margins and their commitment to other business opportunities.

- *Government agencies* may place constraints on project work with regard to legislative frameworks and procedures. Political influence often also has to be managed carefully to benefit the project.

- *Other organisations or individuals,* depending on the nature of the project, may affect the project directly or indirectly. For example, suppliers provide necessary resources for the completion of the project. Delays, shortages and poor quality can bring a project to a standstill. Public interest groups may exert pressure on government agencies. Customers often hire consultants and auditors to protect their interests in a project. Environmentalists can delay a project if they have not been consulted where necessary.

It should be obvious from the above relational network how complex the interdependencies that facilitate project work are.

2.3.2.2 Project management approach

Grundy and Brown (2002) describe conventional (traditional) project management and contrast it with strategic project management (see to Table 2.1). Since project management involves a variety of tasks throughout a project lifecycle, the 'systems approach' to project management has evolved. It is aimed at assisting managers in viewing the intricate details of a project and capturing it as an overview of a holistic phenomenon (Cleland & King, 1983). The strategic approach to project management is more concerned with the holistic nature and the strategic intent of the project in the business.

Table 2.1: Comparison of conventional project management and strategic project management

Attributes	Conventional project management	Strategic project management
Link with business strategy	Direct and explicit	Vague and distant
Project definition	Usually portrayed a 'given'	Highly flexible, creative, depending on options
Project planning	Follows on directly from project definition	Only done once a project strategy is set
Attitude to detail	Very much based on central control	Important but only in context always attempts to focus on the whole, seeing the bigger picture
Importance of stakeholders	Emphasis on formal structures: project manager, sponsor, team	Far-reaching stakeholder analysis requires continual scanning of the environment to detect who are directly or indirectly affected by the project
Importance of uncertainty	Coped with through critical path analysis after activity planning	Uncertainty analysis done first, then activity planning

Source: Adapted from Grundy & Brown (2002:3)

A project management approach, referred to as the 'PROPEL' (an acronym for the six steps) approach, that depicts the key process elements has been developed by Smith (1999). This approach was adapted by Du Plessis (2001). The approach is a step-by-step approach, consisting of a logical flow diagram with six iterative and integrated stages of business project management (see Figure 2.3):

- **P**eople
- **R**equirements
- **O**bjectives
- **P**roject Plans
- **E**xecution/Implementation of the plan
- **L**earning from mistakes and successes, and ensuring a successful ending/closure of the project.

This approach is set out in a flow diagram in Figure 2.3 which enables a project owner/sponsor and project manager to visualise the results of and the process needed to obtain the desired outcomes, thus enabling him/her to think through the six stages. The *first three stages* (people, requirements and objectives) have to be clearly established before the project plan is drawn up, executed and measured/ controlled.

Figure 2.3 on overleaf

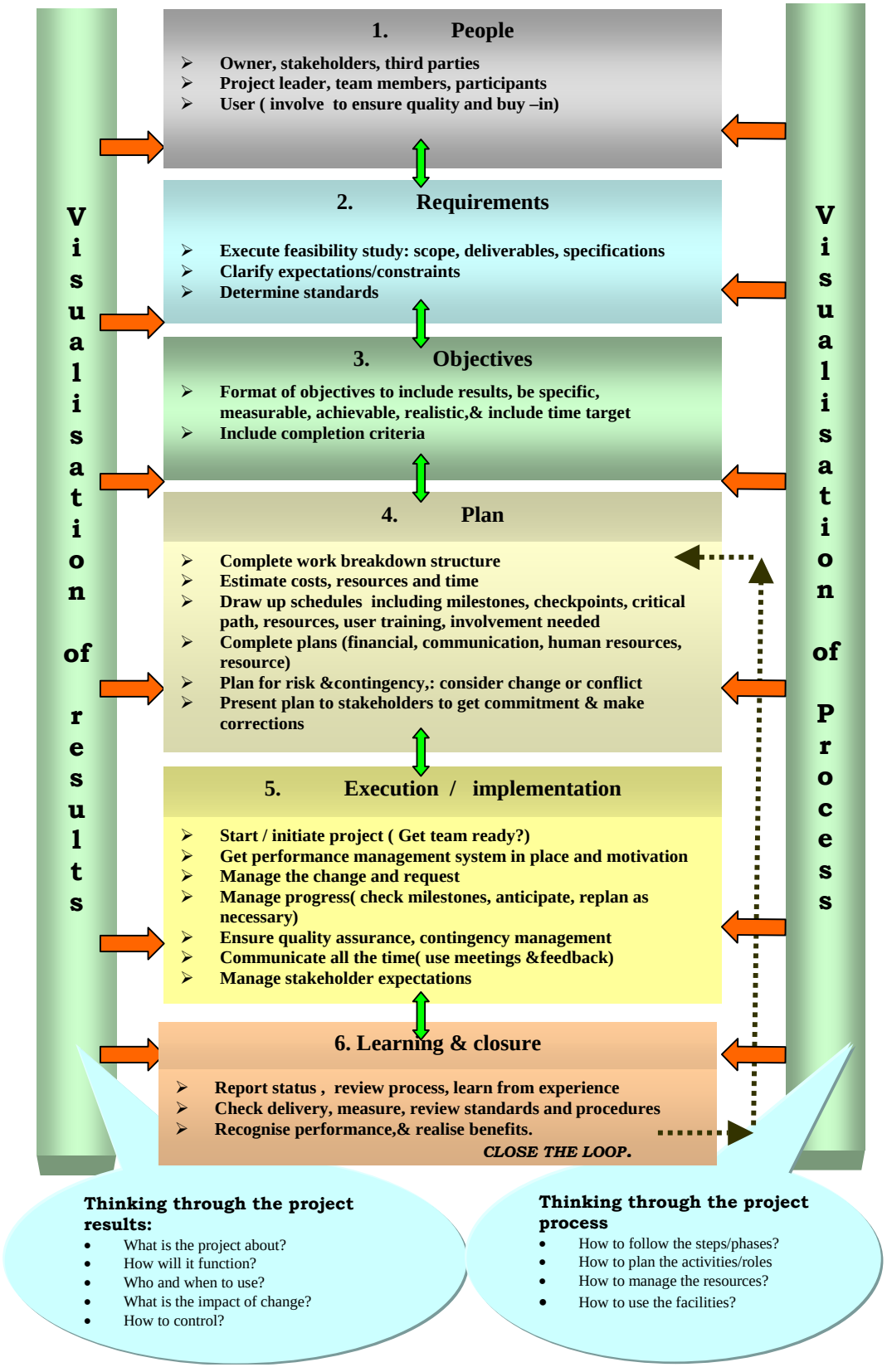

Figure 2.3: PROPEL project management approach (adapted from Smith, 1999)

2.3.2.3 The project lifecycle

From the definition of a project, it is clear that there is a definite start and end. The project can be divided into phases, as in the four-phase project lifecycle approach, (see figure 2.4) as described by Gray and Larson (2000:5-6).

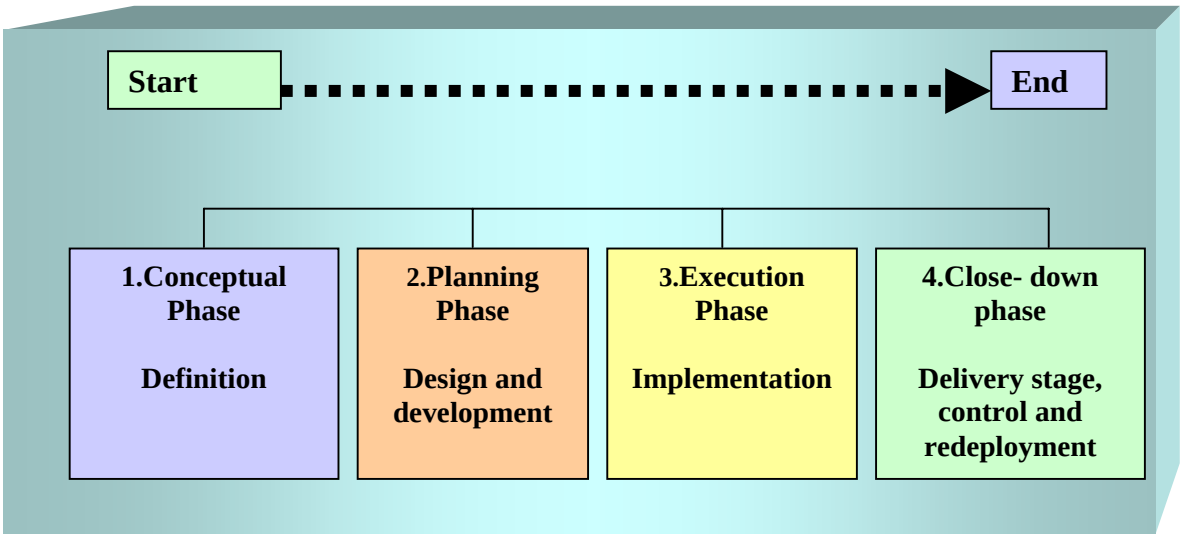

Figure 2.4: Project lifecycle

The strategic project management process described by Grundy and Brown (2002) contains five key stages (see Figure 2.5).

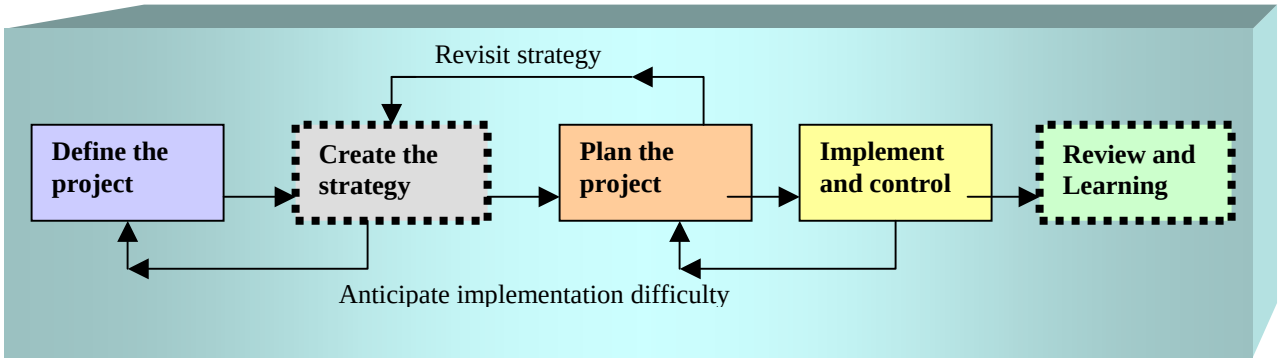

Figure 2.5: Strategic project management process (Grundy & Brown, 2002:13)

The resemblance and differences between the strategic project management process and conventional processes is clear. The strategic project management process is more concerned with the strategic alliance of the project to ensure future enablement. This is especially evident in the review and learning phase, whereas the traditional project management process focuses more on getting the project to deliver the required results and maybe not focusing that much on learning. Both project lifecycles (strategic and traditional) clearly reflect the 'PROPEL' approach (see Figure 2.3), which can be regarded as a combination of the two. It is importance to recognise the lifecycle phases because the emphasis of specific project management cultural elements or the environmental factors necessary for success might differ during each of these phases. This also makes it necessary that projects adopt a flexible approach.

It is clear that project management is not simply a set of tools and techniques, but a process that can be used to help project teams and organisations to succeed by:

- ensuring that all stakeholders are involved in the process and are committed to their role;
- producing deliverables that satisfy customer expectations and needs;
- getting the project done on time and within budget;
- preventing scope creep (constantly changing project requirements);
- making the project a more satisfying experience for team members/ participants and the organisation as a whole; and
- contributing towards the strategic objectives of the organisation.

2.3.3 Project success factors

Projects are run in organisational environments where various factors can influence the different stages of the project lifecycle, especially the implementation thereof, either favourably or unfavourably. The organisational factors that influence the project environment can be external and/or internal to the project environment.

Shenhar *et al.* (2002) used multivariate analysis methods to identify project success factors. They found that project success factors vary with project type, that they depend on high uncertainty or low uncertainty, and that project managers must carefully identify the factors that are critical to their particular project. High-uncertainty projects demand a specific focus on project definition, milestones, design, documentation, policy and customer participation. Low-uncertainty projects need to focus more on formal and structured selection of contractors, budget monitoring, quality and managerial autonomy.

According to a study conducted by Pinto and Kharbanda (1996), the following factors can contribute to project failure**:**

- ignoring the influence of the project environment (including stakeholders);
- pushing a new technology to the market too quickly;
- not bothering about building in fallback options or contingencies;
- when problems occur, blaming the person most visible;
- letting new ideas starve to death from inertia;
- not bothering about conducting feasibility studies;
- never admitting that a project, or part of it, is a failure;
- over-managing project managers and their teams;
- never conducting post-failure reviews;

- never bothering to understand project trade-offs between time, cost and quality;
- allowing political expediency and infighting to dictate crucial project decisions; and
- running a project with a weak project leader.

It is important to understand the factors that can lead to failure, because critical success factors are usually also locked up in these factors. Understanding critical success factors in the project environment is vital for project success.

Graham and Englund, (1997) have designed a tool called 'PEAT' (the Project Environment Assessment Tool) to measure and determine elements of an environment that supports project success. The tool has not been developed to measure project success, but to determine how well organisations support project management. The researchers have identified eight factors that directly influence project success:

- *Strategic emphasis*
  This factor indicates the degree to which the project is aligned with business strategy. In the past, projects often proliferated without any attention being paid to strategic importance. Projects have to be selected based on their contribution to business strategy.

- *Upper management support*
  The degree to which upper management's behaviour supports project success is indicated by this factor. To increase the chances of project success, management should behave in ways sometimes contrary to the accepted ways (organisational culture) in the organisation.

- *Project planning support*
  One of the most important factors in project success is to have team members develop the project plan. This allows them to focus on the project and ensures their commitment.

- *Customer/end-user input*
  Successful projects need close contact to be kept with customers and end-users in order to get the specifications and features of what is needed correct to ensure satisfactory design and implementation.

- *Project team development*
  A well-functioning team whose members are committed and motivated is essential for a successful project.

- *Project execution support*
  Organisational practices and systems must support the implementation of the project. Often the start of a project is accompanied by 'fanfare', but support then waves during the implementation phase, allowing the project to "starve to death'.

- *Communication and information systems*
  Good communication amongst project members is important. Communication should flow easily across different teams, project reviews and regular feedback is vital. Information should be made available to all current and future project teams.

- *Organisational support*
  The systems in the organisation should support projects. Rewards and promotions should foster positive performance and motivation.

Research by other researchers support these factors (Brown, 1999; Clarke, 1999; Johns, 1999; Cooke-Davies, 2002; Lahey, 2002; Loo, 2002; Jiang, Klein & Discenza, 2002). Success factors found in the literature were integrated into eight main categories (see Table 2.2), that are described in detail below, to establish what the desired project success factors are that should be exhibited by an organisation with a successful project management culture.

Table 2.2: Main Categories of Project Success Factors

1. Stakeholders involvement and commitment
2. A team-based and participatory approach
3. Project orientation and control
4. Project management methodology
5. Communication and information systems
6. Risk management
7. The people culture factor
8. Project review and learning

2.3.3.1 Stakeholders involvement and commitment

- *Solid business sponsorship* is needed. A lack of executive-level commitment is a common element of project failure. Executive sponsorship becomes extremely critical in projects that affect the culture of the organisation (Zimmer, 1999). Project sanction as described by Hall (1999) refers to
  - the buying into a project by the senior executive of an organisation who is sponsoring the change (for example, a board director), who is the accountable executive (responsible to the directors and ensuring that the change meets expectations) and who will manage the project;

- the advantages/benefits to be gained (for example, competitive advantage, additional profit gained via a new product, customer retention through cost reduction);
- the impact on the organisation (such as the operational cost of change and the effect on staff);
- any known risks associated with the change (risk is assessed in more detail once the project begins);
- the terms of reference; the time scales for implementation;
- the cost of the change (including project/implementation costs); and
- the pay-back period.

- *Top executives* must 'walk the walk and talk the talk' in building a project management culture (Saia, 1997).

- *Middle management involvement* is evident. Glaser, Zamanou and Hacker (1987) suggest that an important reason why involvement programmes fail is that mid-level managers feel left out and alienated by the process. They are the ones that lose power, as they are asked to give up their main function in the organisation: making decisions. Glaser *et al.* (1987) propose that for an employee involvement program to be successful, involving middle managers in the initial phases of the programme is essential.

2.3.3.2 Team-based and participatory approach

The project leader should act as a facilitator to the team and as a guide throughout the project management process. The team creates the project plan. The team monitors and controls the project. The team assesses what went well and what should be improved for the next project. This approach to project management means that project managers must learn new skills (conflict resolution, active listening, team participation, team decision

making) that participative managers have been using for a long time, but that are new to traditional practices with regard to project management. The participative approach to managing a project is a critical factor in creating better project results (Martin & Tate, 1998; Sweeney & Lee, 1999; Cleland, 1996). Saia (1997) refers to this critical success factor as 'Team leadership'.

2.3.3.3 Project orientation and control

Once the project has been sanctioned, the first task the project manager should undertake is to run a 'Project Definition Workshop' (PDW) to be attended by the key personnel (stakeholders) who will be involved (it may also involve suppliers if they play an important role). In most cases the PDW is the first opportunity for participants to obtain a detailed understanding of the business change and to start building the project team.

Progress has to be monitored to make sure the project stays on track and hence progress reports have to be produced (for the project manager, review board and directors) (Hall, 1999).

2.3.3.4 Project management methodology (Martin & Tate, 1998; Zimmer, 1999)

Project management methodology can be set out using the following headings:

- *Definition of the projects*
  Each project must be defined adequately, based on the needs of the company.

- *Specifications* should be developed in all but the simplest projects. (This has been found to be a common element of project failure). Many companies skip the specification process and 'window shop' for technology or processes. The end result is an actual purchase without a clearly defined need. Often the decision to purchase is based solely on the performance claims of the manufacturer.

- *Project deadlines and milestones*
  Unrealistic milestone dates demoralise the spirit of the project team. Project managers must give special care when developing the project plan so that each 'chunk' is attainable within a reasonable timeframe.

- *Break projects into realistic chunks*
  Companies that use a 'shotgun' approach to implementing technology or processes often fail. A project manager must develop a plan that breaks up a project into 'chunks' of deliverables complete with deadlines, and must assign responsibilities and accountability (Hall, 1999).

- *Skilled project managers to highly complex projects*
  Project managers must possess a well-rounded set of skills to succeed. They must have a thorough understanding of the process involved with the project. They must be coaches and motivators as well as excellent communicator. Project management is not for the faint-hearted. 'Don't put someone in charge of a project simply because you don't have any other place in the organisation for them'.

- *Robust project process architecture*
  Project management is a process. Omitting key pieces of the process or having no clearly defined process often results in substandard results or even failure.

- *A comprehensive project portfolio.*
  Project managers must develop a comprehensive project plan, one that spans the project-life cycle, from conception to implementation, maintenance, and beyond. Every effort must be made to anticipate all outcomes. It is usually unanticipated elements that damage project managers' careers.

2.3.3.5 Communication and information systems

Humans spend 70% of their days communicating in one form or another. This underlines the importance of communications as a key to a successful project. Poor communications, at best, hinder progress and, at worst, sink the project. Good project management practice includes a communications plan. It is vital that the culture of the areas to be affected by the project change is well understood before the communication plan is finalised. A thorough understanding of the culture, or 'the way we do things around here' influences the communication approach (delivery channels, media, terminology) chosen for the communications campaign (Saia, 1997; Hall, 1999).

Information should be readily available to support the project. Interpersonal communication, due to the interdependence amongst all the relevant parties, is also vital for project success (Graham & Englund, 1997).

2.3.3.6 Risk Management

There are two types of risk involved in the project environment, namely project risk and operational risk. Project risk refers to all risks that, if realised, would impair the successful delivery of the business change. Operational risk is requires an understanding of the business change that is to take place and the identification of any risk for the business operation.

2.3.3.7 The People culture factor

Even with the best laid plans things can go wrong, either due to circumstances unforeseen within the project plan, or due to unexpected reaction from the people involved. The project team is involved from the start of the project and should understand the need for the project, thus the need for change. Those affected by the project's implementation may not. People do not like change; they may prefer the status quo. Those affected may raise minor objections and delay the project, or worse still, they may refuse to accept the project or the change. The consequence of this is that the project flounders. Note that those affected may not be within the organisation; they could be customers or suppliers in the external environment.

To understand the project impact on people it must be seen from their perspective and an understanding of the culture they live in is essential. To experience their culture one has to empathise and in fact become one of them. Thus, having to put oneself in their shoes understand how one would feel if one were on the receiving end; understand what is reality to them. They may be simply misinformed or their resistance could be more deeply rooted. By getting people involved as early on as possible in the project process one can obtain feedback and problems can be detected and any signs of concern that could lead to problems later on are more visible. The aim of sound communication is to build a bond of mutual understanding. Once this bond has been established, it has to be maintained. This means being honest and this demands sharing bad news as well as good news. People do not like being kept in suspense; and they certainly do not like surprises. The secret of success is to anticipate problems, to look for early signs of things out of the ordinary and to have a process to handle and resolve them successfully.

2.3.3.8 Project review and learning

The ideal time to undertake a formal review of the project is when the experiences of the project are still fresh in everyone's mind. Ideally, this review should occur before the project is signed off. To conduct a proper project review it is essential to have all those with a vested interest attend (this includes the sponsor, the project manager, the project office manager, the communications manager, someone from the area in which the project is effected, any supplier involved, etc.). The purpose of the review is to ensure that the process was followed. This includes checking whatever the sanction process was adhered to, project management and control was effective, risk was managed, communications were effective, the appropriate project documentation was produced, the agreed deliverable and benefits were realised (Hall, 1999).

It is vital that the review is documented, not only to formally record the outcome, but also for the benefit of other projects (they can learn from the experience and apply the lessons learned). It is all about continuous improvement for the overall benefit of the organisation (and this is a must for a 'learning organisation'). Learning is the process by which knowledge is created from experience and the path by which improvement takes place (Bohn, 1994; Fiol & Lyles, 1985). Peters and Homer (1996) emphasize the need for project managers to learn continuously. What is also needed is a set of processes for supporting learning among project team members (Kotnour, 1999; Deane & Clark, 1997).

The project success factors described above can also be identified in the 'PROPEL' approach in Figure 2.3.

2.4 ORGANISATIONAL CULTURE AND PROJECT MANAGEMENT CULTURE

The concept 'organisational culture' is explored below. This was done to enable the researcher to conceptualise the context in which a project management culture, as a holistic operational culture, has to come into existence. The importance of organisational culture for business success was also investigated to establish the role of culture as a success factor.

It was found, from the body of knowledge in literature, that the concepts 'project culture', 'project management culture', 'project climate' and 'project environment' are interrelated and are often used in the same context.

2.4.1 Organisational culture

There seems to be no clear definition or description of organisational culture. Kroeber and Kluckholn (1952) have identified 164 definitions of culture. Ott (1989) has listed 73 phrases used to define organisational culture as identified from 58 published sources. Lundberg (1990) provides the following comments about organisational culture, referring to it as:

- a shared, common frame of reference (in other words it is largely taken for granted and is shared by some significant portion of members, in the case of this study stakeholders in the project environment;
- acquired and governing (in other words it is socially learned and transmitted by members and provides them with rules for organisational behaviour; in the case of this study the practices and principles of project management);
- a common psychology (it denotes the organization's uniqueness and contributes to its identity);

- enduring over time (it can be found in any fairly stable social unit of any size as long as it has a reasonable history);
- symbolic (it is manifested in observables such as language, behaviour and things which are attributed meanings);
- being at its core typically invisible and determinant (it ultimately consists of a configuration of deeply buried values and assumptions); and
- modifiable but not easily so.

Schein (1990) regards culture as a layered phenomenon, composed of interrelated levels of meanings – from those relatively observable to those mostly invisible. Schein (1985) specifies three levels: artefacts and creations, values and basic assumptions.

Organisational culture refers to a system of shared norms, beliefs, values and assumptions which bind people together, thereby creating shared meanings. Customs, norms and habits that exemplify the values and beliefs of the organisation manifest this system. Culture reflects the personality of the organisation and, similar to an individual's personality, can enable us to predict attitudes and behaviours of organisational members. Culture is also one of the defining aspects of an organisation that sets it apart from other organisations even in the same industry (Ball & Asbury, 1989).

To be effective, an organisational culture requires consistency among its various dimensions. In addition, each type of organisational culture reflects a socially constructed, stable sense of what an organisation is and should be. Each represents what certain groups of people think when they hear the word 'organisation', or when they consider which organisations are 'good'. Culture is a characteristic of the organisation, not of individuals, but it is manifested in and measured from the verbal and/or non-verbal behaviour of individuals - aggregated to the level of their organisational unit. People who

hold a common conception of what the organisation should be and how work should be organised tend to create an organisation that realises that conception. An individual who joins that organisation tends to become socialised to that conception and comes to perceive the way work is conducted as appropriate and natural (Deal & Kennedy, 1982).

Organisations can produce a culture within themselves. Researchers that hold this view of culture generally have a systems theory approach. Typical variables that are considered in this research tradition are structure, size, technology and leadership patterns in an organisational environment. The overall systemic balance and effectiveness of the organisation is in some way attributed to the organisational culture (Smircich, 1983).

Gordon (1991) suggests that the nature of an industry has an important influence on corporate culture. If an industry's environment changes it results in a dysfunction between and organisation's culture and industry demands. Thus corporate culture is strongly influenced by the characteristics of the industry in which an organisation operates.

2.4.1.1 Dimensions in Organisational Culture

According to Gray and Larson (2000:236-237), research suggests that there are ten primary characteristics which capture the essence of an organisation's culture. The key dimensions of an organisation's culture (also see Figure 2.6) are the following:

- member identity – the degree to which employees identify with the organisation as a whole rather than with their type of job or field of professional expertise;

- team emphasis – the degree to which work activities are organised around groups rather than individuals;
- management focus – the degree to which management decisions take into account the effect of outcomes on people within the organisation;
- unit integration – the degree to which units within the organisation are encouraged to operate in a co-ordinated or interdependent manner;
- control – the degree to which rules, policies, and direct supervision are used to oversee and control employee behaviour;
- risk tolerance – the degree to which employees are encouraged to be aggressive, innovative, and risk-seeking;
- reward criteria – the degree to which rewards such as promotion and salary increases are allocated according to employee performance rather than seniority, favouritism, or other non-performance factors;
- conflict tolerance – the degree to which employees are encouraged to air conflicts and criticisms openly;
- means versus end orientation – the degree to which management focuses on outcomes rather than on techniques and processes used to achieve those results; and
- open-systems focus – the degree to which the organisation monitors and responds to changes in the external environment.

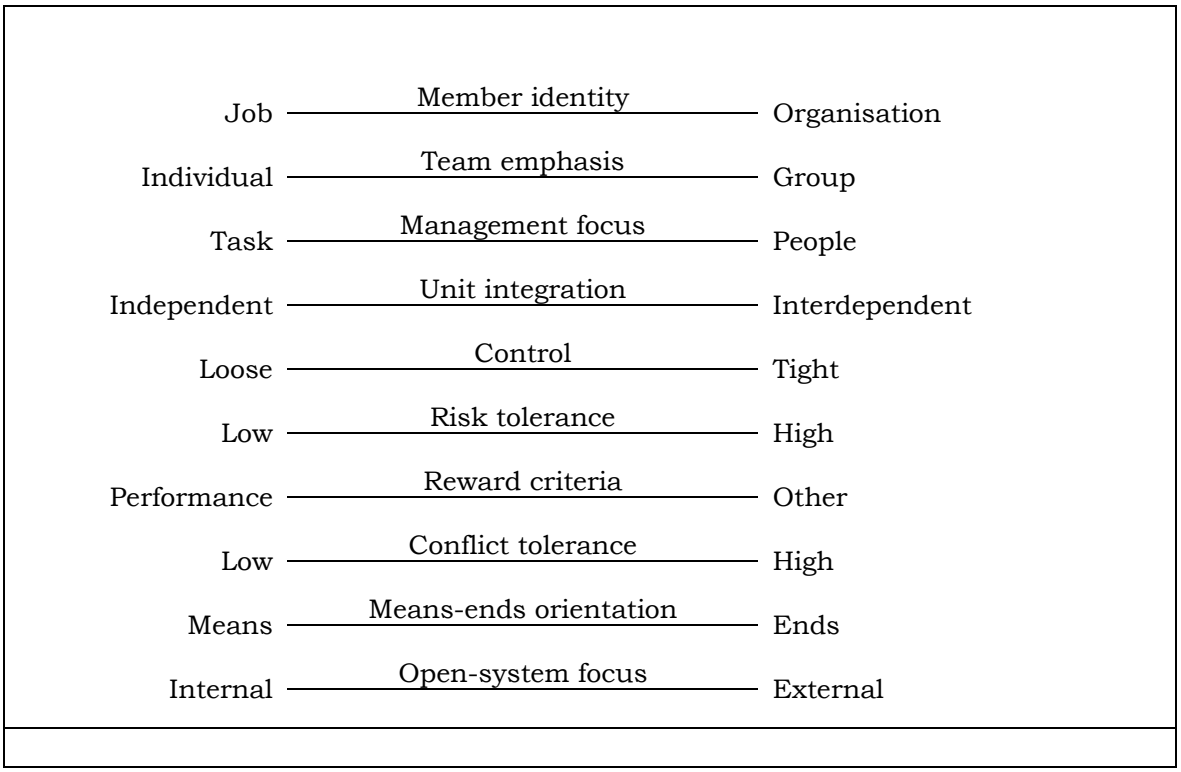

Figure 2.6 Key dimensions defining an organisation's culture

Hofstede (1998) have identified six dimensions of (perceived) practices of culture in a cross-organisational factor analysis study of 20 organisational units:

- Dimension 1: process-oriented vs. results-oriented
- Dimension 2: employee-oriented vs. job-oriented
- Dimension 3: parochial vs. professional
- Dimension 4: open system vs. closed system
- Dimension 5: loose vs. tight control
- Dimension 6: normative vs. pragmatic

These dimensions can be briefly described as follows:

Dimension 1 explores the differences between a concern with means and a concern with goals. The three key items show that, in process-oriented cultures, people perceive themselves as avoiding risks and expending only a limited effort on their jobs, while each day is pretty much the same. In a results-oriented culture, people perceive themselves as being comfortable in unfamiliar situations and putting in a maximum effort, while each day is felt to bring new challenges.

Dimension 2 explores the differences between a concern for people and a concern for getting the job done. The key items selected show that, in employee-oriented cultures, people feel that their personal problems are taken into account, that the organisation takes a responsibility for employee welfare, and that important decisions tend to be made by groups or committees. In the job-oriented units, people experience a strong pressure to get the job done. They perceive the organisation as only being interested in the work employees do, not in their personal and family welfare; and they report that important decisions tend to be made by individuals.

Dimension 3 compares and contrasts units whose employees derive their identity largely from the organisation with units in which people identify with their type of job. The key questions show that members of parochial cultures feel that the organisation's norms cover their behaviour at home as well as on the job. They feel that in hiring employees, the company takes their social and family background into account as much as their job competence; and members do not look far into the future (they assume the organisation will do this for them). Members of professional cultures, however, consider their private lives to be their own business. They feel that the organisation has hired them on the basis of their job competence only, and they think far ahead.

Dimension 4 looks at the differences between open and closed systems. The key items show that in open system units members consider both the organisation and its people to be open to newcomers and outsiders; almost anyone would fit into the organisation, and new employees need only a few days to feel at home. In closed system units, the organisation and its people are felt to be closed and secretive, even in the opinion of insiders. Only very special people fit into the organisation, and new employees need more than a year to feel at home.

Dimension 5 looks at the amount of internal structuring in the organisation. According to the key questions, people in 'loose control' units feel that no one thinks of cost, meeting times are only kept approximately, and jokes about the company and the job are frequent. People in 'tight control' units describe their work environment as cost-conscious, meeting times are kept punctually, and jokes about the company and/or the job are rare.

Dimension 6, finally, deals with the popular notion of 'customer orientation'. Pragmatic units are market-driven; normative units perceive their task towards the outside world as consisting of the implementation of inviolable rules. The key items show that, in the normative units, the emphasis is on correctly following organisational procedures, which are more important than results; in matters of business ethics and honesty, the unit's standards are felt to be high. In pragmatic units, there is a strong emphasis on meeting customers' needs, results are more important than correct procedures, and in matters of business ethics, a pragmatic rather than a dogmatic attitude prevails.

In terms of the above dimensions it is possible to distinguish between different types of organisational culture by utilising assumptions about work means and assumptions about work ends. The focus will be on work means.

The assumptions about work ends deal with issues related to organisational performance and productivity concerns.

Work means assumptions can be divided into two areas:

- structural and organisational design elements; and
- people-related elements.

The structural concerns and organisational design elements are

- division of labour. This concerns the degree to which it is thought, at one end of the spectrum, that jobs should be highly specialised and formalised, or, at the other, that they should be varied and flexible. It also concerns the hierarchical nature of the relationship among jobs - that is, how much power and autonomy should be allotted to different positions.

- locus of identification and involvement. This focuses on employees' commitment to the organisation. The level of commitment can range from superficial and instrumental to internal and personal. The object of commitment can take many forms: it can be the organisation itself, the business unit, the boss, the profession, the client, the product, or the systems of the organisation.

- main control mechanism. This refers to the ways the organisation and its management ensure that employee actions contribute to organisational objectives and that the efforts of various units are co-ordinated.

- information flow. This refers to the degree to which information should either flow freely or be withheld, and the legitimacy of informal communication.

Concerns related to the people side of the organisation are the following:

- power base. This refers to the foundations of power in the organisation. It is concerned with the legitimacy of power and indicates what kind of power is acceptable to the members of the organisation and why.

- career plan and basis for promotion. This identifies the career paths valued within the organisation and the criteria used to facilitate or hinder the clearing of various vertical or lateral professional hurdles.

- conflict identification and resolution. This refers to the dominant or accepted criteria used in the organisation to label an incident as a conflict and to identify acceptable ways of resolving it.

2.4.1.2 The importance of an Organisational Culture

Peters and Waterman (1982) told managers that the key to organisational success lay in having a strong culture. This resulted in an upswing in interest in an organisational culture (Lewis, 1996a).

Culture performs several important functions in organisations. An organisation's culture provides a sense of identity for its members. The more clearly an organisation's shared perceptions and values are stated, the more strongly people can identify with their organisation and feel a vital part of it. Identity generates commitment to the organisation and reasons for members to devote energy and loyalty to the organisation.

An organisational culture helps legitimise the management system of the organisation. Such a culture helps to clarify authority relationships and provides reasons for why people are in a position of authority and why their authority should be respected. Furthermore, an organisational culture, through organisational myths, stories and symbols helps people to reconcile incongruities between ideal and actual behaviour.

Most importantly, organisational culture clarifies and reinforces standards of behaviour. It helps people to define what is permissible as opposed to inappropriate behaviour. These standards span a wide range of behaviour from dress code and working hours, to challenging the judgement of superiors and collaborating with other departments. Ultimately, an organisational culture helps create social order within an organisation and influences performance (Zwell, 2000). The customs, norms and ideals conveyed by the culture of an organisation provide the stability and predictability in behaviour that is essential for an effective organisation.

Although this discussion of organisational culture may appear to suggest that one culture dominates in an entire organisation, in reality this is rarely the case. 'Strong' or 'thick' are adjectives used to denote a culture in which an organisation's core values and customs are widely held and widely shared within the entire organisation. Conversely, a 'thin' or 'weak' culture is one that is not widely shared or practised within a firm.

Even within a strong organisational culture, there are likely to be subcultures often within specific departments or speciality areas. Similarly, countercultures can emerge within organisations that reflect a different set of values, beliefs and customs – often in direct contradiction to the culture espoused by top management. How pervasive these subcultures and countercultures are affects the strength of the culture of the organisation

and the extent to which organisational culture influences members' actions and responses (Gray & Larson, 2000).

Martins and Terblanche (2003) describe the roles that organisational culture play in an organisation. It can be divided into the *functions* of organisational culture and the *influence* that organisational culture has on the different processes in the organisation.

The functions of organisational culture as discussed by Furnham and Gunter (1993) are internal integration and co-ordination. Internal integration can be described as the socialising or orientation of new members in the organisation, creating the boundaries of the organisation, a feeling of identity among employees and commitment to the organisation. The co-ordinating function refers to creating a competitive edge, making sense of the environment in terms of what is required as acceptable behaviour and social system stability 'which is the social glue that binds the organisation together' (Martins, 2000).

Organisational culture offers a shared system of meanings which forms the basis of communication and mutual understanding. If an organisational culture does not fulfil these functions in a satisfactory way, the culture may significantly reduce the efficiency of an organisation (Furnham & Gunter, 1993).

Organisations use different resources and processes to guide behaviour and change. Organisational culture complements rational managerial tools by playing an indirect role in influencing behaviour. Organisational culture epitomises the expressive character of organisations: it is communicated through symbolism, feelings, the meaning behind language, behaviours, physical settings and artifacts. Rational tools and processes like strategic direction, goals, tasks, technology, structure, communication,

decisionmaking, co-operation and interpersonal relationships are designed obtain results.

The expressive practice of organisational culture is more a reflection of a way of saying things (Coffey, Cook & Hunsaker, 1994). Organisational culture fills the gaps between what is formally announced and what actually takes place. It pushes the strategy of the organisation into the desired direction (Martins, 2000).

2.4.2 Project management culture

Project management culture has been described by various authors, including, Wang (2001), Gray and Larson (2000), Kerzner (2000), Graham (1993), Hobbs and Menard (1993), Harrison (1992), Firth and Krut (1991), and Cleland (1982). However, none of these authors have clearly defined the concept 'project management culture' as a holistic, systemic phenomenon. To some degree, several of them, regard project management culture as the culture of the project management profession or the project team. Hobbs and Menard (1993:96) refer to a 'project management culture as a system of attitudes and behavior patterns'. Cleland (1982:181) states: 'Taken in its cultural context, project management is a complex whole that includes knowledge, belief, skills, attitudes, and other capabilities and habits acquired by people who are members of some project society'.

However, most of the above authors use the term 'project management culture' or other similar terms in the sense of a sub-culture in an organisation instead of the operational culture of the organisation. It is used to support the successful management of projects as a holistic phenomenon. Wang (2001) has developed a project culture definition and description for the project management profession. Duncan (2001) has developed a project management culture model which provides a mechanism to assess how

'project friendly' an organisation is; and Kerzner (2000: 212) refers to 'corporate cultures for project management'.

Some authors (Gray & Larson, 2000; Graham, 1993; Hobbs & Menard, 1993; and Firth & Krut, 1991) have indicated some work-related values and beliefs as dimensions of a project management culture, for example:

- Project management is results-oriented.
- It is pre-occupied with the integration of various efforts and disciplines.
- Uncertainties and changes are taken as a way of life.
- Temporary situations and relationships are normal.
- People's status comes from what they do rather than who they are.
- Speed, flexibility, and lateral communication are emphasised.
- Teamwork is highly valued.
- People are task-oriented rather than authority-oriented.
- Indefinite and inadequate authority is not unusual.

Gray and Larson (2000) attempt to give meaning to the concept as described in the following riverboat trip metaphor:

> 'Culture is the river and the project is the boat. Organising and completing projects within an organisation in which the culture is conducive to project management is like paddling downstream. Much less effort is required, and the natural force of the river generates progress towards the destination. In many cases, the current can be

> so strong that steering is all that is required. Such is the case for projects that operate in a project-friendly environment *where teamwork and cross-functional co-operation are the norms, where there is a deep commitment to excellence, and where healthy conflict is voiced and dealt with quickly and effectively'.*

Conversely, trying to complete a project in an organisation in which several important features of the dominant culture inhibit effective project management is like paddling upstream; much more time, effort, and attention are needed to reach the destination. This would be the situation in cultures that *discourage teamwork and co-operation, that have a low tolerance for conflict, where risks are to be avoided, and where getting ahead is based less on performance and more on cultivating favourable relationships with superiors*. In such cases, the project manager and her people not only have to overcome the natural obstacles of the project but also have to overcome the prevailing negative forces inherent in the culture of the organisation. Greater project authority and resources are necessary to complete the projects that encounter a strong, negative cultural current. Conversely, less formal authority and fewer dedicated resources are needed to complete projects in which the cultural currents generate behaviour and co-operation essential to project success. The key issue is the degree of interdependency between the parent organisation and the project team and the corresponding need to create a unique project management culture conducive to successful project completion. *(my emphasis)*

Du Plessis (2001) has defined the concept project management culture as a broader concept inclusive of interdependent parts based on the systems theory.

In view of the literature researched it can be concluded that there is no 'ideal' project management culture, but that there are certain dimensions that can

be utilised to underpin a culture. If the associated descriptive elements of a successful project, project management and organisational culture are taken into consideration it is possible to identify the cultural elements in an organisation that can contribute successfully to a project.

2.4.2.1 Project management culture dimensions and associated descriptive elements

Gray and Larson's (2000:241-243) findings of cultural dimensions supportive of project management are set out in Figure 2.7 and discussed below.

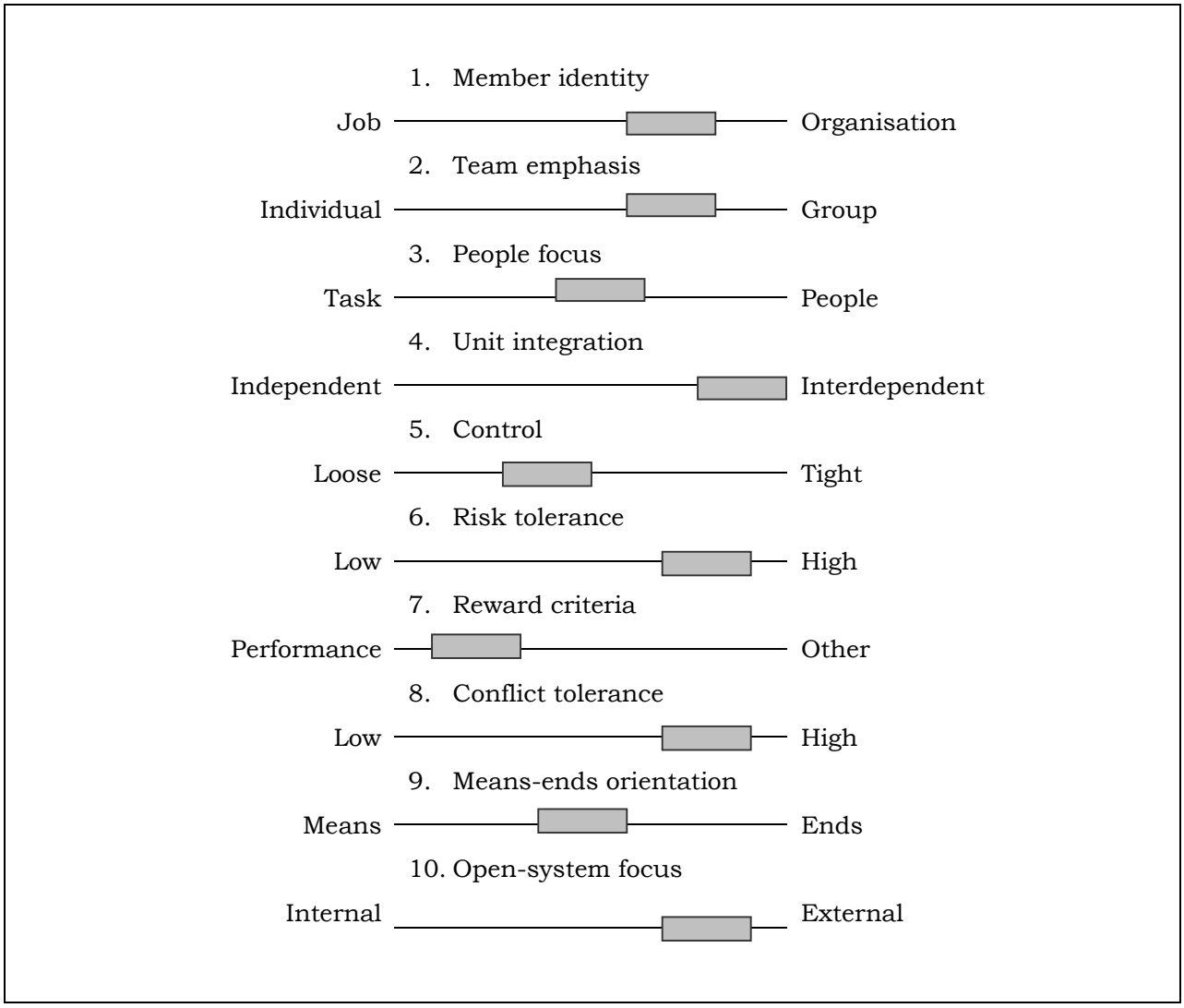

Figure 2.7: Culture dimensions of an organisation supportive of project management

The ideal culture is not at any extreme of these dimensions. For example, a fertile project culture is likely to be one in which management balances its focus on the needs of both the task and the people. An optimal culture would balance concern with output (ends) and processes to achieve those outcomes (means). In other cases, the ideal culture would be at one end of the spectrum of a dimension. Most projects require collaboration across disciplines.

Therefore it is desirable that the culture of the organisation emphasises working in teams and identifying with the organisation, not just the professional domain. Likewise it is desirable that the culture supports a certain degree of risk-taking and a reasonably high conflict tolerance.

In cases where the prevalent organisational culture supports the behaviours essential to project completion, a weaker project management structure can be effective.

When the parent organisation possesses a dominant culture that inhibits collaboration and innovation among disciplines and groups of people, it is advisable to insulate the project team from the dominant culture by creating a self-sufficient, dedicated project team. If a dedicated project team is impossible because of resource constraints, then at least a project matrix should be used where the project manager has centralised control over the project. In both cases, the managerial strategy is to create a distinct subculture within the project team in which a new set of norms, customs and values evolve that are conducive to project completion.

The managerial strategy should be to insulate project work from the dominant culture so that a more positive 'sub-culture' can emerge among project participants. The project management structure of the organisation

and the culture of the organisation are key elements of the environment in which a project is initiated.

Du Plessis (2001) has identified and integrated elements of project management culture based on a triangulation study including a literature study, a qualitative survey questionnaire and a concept mapping technique. The findings of the research by Du Plessis (2001) indicate that a project management culture can be based on four highly interdependent key dimensions, with descriptive elements (as mentioned in the definition earlier in this chapter in Figure 2.2). The four dimensions are:

- the *project process* (what needs to be done);
- the *people and their behaviour* in the project environment (who needs to deliver, to whom - stakeholders and project team);
- the *project structure and systems* (methodology, practices and principles); and
- the *project environment* (internal and external to the project).

These dimensions also form the basis of the model on which this study is conducted.

2.5 ORGANISATIONAL CULTURE ASSESSMENT

Although the concept of organisational culture has been prominent in organisational and management literature since the 1970s (Barley, Meyer & Gash, 1988), researchers still disagree on the best way to measure it (O'Reilly, Chatman & Caldwell, 1991; Rousseau, 1990).

2.5.1 Measuring organisational culture

In the mid-1980s, researchers and practitioners began to question the use of organisational culture information and its applicability as a managerial tool.

This resulted in the first attempts to measure organisational culture quantitatively. Among authors who suggest some use of quantitative measures are Cooke and Rousseau (1988), Reynierse and Harker (1986), Reynolds (1986), and Wiener (1982).

Many researchers have agreed that triangulation (multimethod) is the most accurate way to capture the idiosyncrasies of an organisation's culture, because the vantage point from which one looks at a phenomenon determines what it is that one sees, and no single vantage point provides a complete picture (Faules, 1982; Rodrick, 1988). An intriguing advantage of triangulation is the focus on multimethods (Cheney, 1983; Faules, 1982; Glaser *et al.*, 1987; Jick, 1979; Rousseau, 1990). Triangulation combines the specificity and accuracy of quantitative data with the ability to interpret idiosyncrasies and complex perceptions provided by qualitative analysis (Kreps, 1989). Other researchers have suggested the use of multiple methods (Reynierse & Harker, 1986; Rousseau, 1990), but these methods have been described as complex, expensive and time-consuming.

The literature suggests that questionnaires can play an important role in the quantitative analysis of organisational culture (Reichers & Schneider, 1990; Rousseau, 1990).

Meek (1988) argues that organisational culture is an all-encompassing concept that needs to be broken up into manageable proportions for study. Grundy and Rousseau (1994) make the point, more over, that Schein's (1985) model of culture (often used as basis for organisational culture research) implies a complex, multilevel phenomenon that can be construed in many different ways.

Schein (1985) suggests that organisational culture has three levels

> The levels range from visible artifacts and creations to testable values and lastly to invisible and even preconscious basic assumptions. It is his view that all three levels must be studied to achieve a complete view of an organisation's culture
>
> In view of this complexity this study agrees, with Marcoulides and Heck's (1993) view that the delineation of an organisations culture's parameters must start with a realistic admission of its limitations.
>
> The limits of a quantitative study of organisational culture are set out in Smircich's (1983) description of two aspects of organisational culture: it is something an organization *has* and it is something an organization *is*. This research study regards culture primarily as something that an organisation *has*.

The most appropriate means of assessment of organisational culture according to Rousseau (1990), depends on the cultural level to be examined. It is generally agreed that surveys represent an efficient and standardised means of tapping the shallower levels of Schein's typology, which are the artifacts and testable values. The deepest level of culture which is the basic assumptions, on the other hand, can be investigated only through more intensive observation, focused interviews and the involvement of organisational members in self-analysis (Ott, 1989; Rousseau, 1990; Schein, 1990). The thrust of this argument is that there is a clear and continued role for quantitative measures as a means to assess the less abstract levels of organisational culture.

Deal and Kennedy (1982) propound a different view, namely that there may be grounds for maintaining that the three levels of culture described by Schein (1985) are unified, especially when a culture is strong. A 'strong'

culture is described by Deal and Kennedy (1982) as an organisational culture with a consensus on values that drive the organisation towards performance. In this case, quantitative measurements of organisational culture may have the potential to tap deeper levels of culture (Ott, 1989; Rentsch, 1990). It has even been mentioned that organisational culture may be rooted in perceived practices rather than in values (Hofstede & Neuijen, 1990), and therefore offers a window into the operating environments of organisations. Although this conclusion may be caused by the relatedness of practices and the values they reflect, such questions serve to emphasise further the potential of quantitative measures to increase the understanding of organisational culture.

Ashkanansy, Broadfoot, and Falkus (2000a) note that the nature of survey methods render them especially useful for organisational culture research. Self-report measures have been found to offer internal credibility to organisational members, which is likely to increase the likelihood that members will accept the results of the survey. Researchers such as Cheney (1983), Faules (1982), Glaser *et al*. (1987), Jick, (1979), Reichers & Schneider (1990), Cooke & Rousseau (1988), Rousseau (1990) and Xenikou and Furnham (1996) have cited numerous other advantages of survey assessment and of quantitative techniques generally. These include allowing replication and cross-sectional comparative studies, providing an accepted frame of reference for interpreting data, helping the evaluation and initiation of culture change efforts in organisations, and providing data that can be analysed through multivariate statistical techniques.

2.5.2 Survey methods for measuring organisational culture

The interest in organisational culture noted by Barley *et al*. (1988) has given rise to a variety of questionnaires designed to assess organisational culture.

There are significant differences between them. There is a lack of consensus concerning questionnaire format or style (Frost, Moore, Louis, Lundberg, and Martin, 1991; Ott, 1989; Rousseau, 1990). The lack of a theoretical basis for many of these instruments is further cause for concern on the part of cultural researchers and practitioners.

Ashkanasy *et al.* (2000a) have compared a diverse range of instruments and have classified 18 instruments published from 1975 to 1992. They also present a new typology for the classification of culture measures and have reviewed a wide range of organisational culture surveys. They sought to present them in a consistent framework that would allow for comparison. Surveys can be classified as either *typing* or *profile* scales.

Typing surveys are those that are those that classify organisations into particular taxonomies. They use standardised instruments to yield discrete sets of organisational culture 'types'. Usually, the types are accompanied by detailed descriptions of the behaviours and values associated with them (for example, Myers-Briggs). Thus typing allows respondents to understand the consequences of their type-category membership and also to compare their types with others). The work of Cooke and Rousseau (1988), for example, suggests that typing can help managers to articulate their visions of change, expressing them in terms of behaviours needed from organisation members. The use of typing is also beneficial for tracking the process of cultural change in organisations (Ashkanasy & Holmes, 1995).

Typing surveys identify organisations as belonging to one of several possibly mutually exclusive categories. The typing approach is subject to the following *limitations*:

- Typing implies discontinuous categories, something that is difficult to sustain on theoretical grounds (Rousseau, 1990).

- Typing implies that all organisations of a particular type are similar, or should be similar, neglecting the unique nature of cultures (Schein, 1985).

- Not all organisations necessarily conform to particular types, since they are unique, whereas others appear to be mixtures of types (Deal & Kennedy, 1982).

Profiling surveys are concerned with describing organisations' cultures by measuring the strengths or weaknesses of a variety of organisational members' beliefs and values. The different scores on several culture dimensions, generated by the varying outcomes for different beliefs and values, provide a profile of an organisation's culture. Profiling surveys differ from typing surveys in that they categorise organisations in terms of multiple categories of norms, behaviours and values or beliefs that are not necessarily mutually exclusive. According to Ashkanasy *et al.* (2000a), profiling surveys can be divided into three subcategories: effectiveness surveys, descriptive surveys, and fit profiles.

- *Effectiveness surveying* is the most prevalent approach, assessing the values that are thought to produce cultures associated with high levels of organisational effectiveness and performance.

- *Descriptive instruments* measure values, but no evaluation of an organisation's effectiveness is made on this basis.

- *Fit profiles* look at the congruence between individuals and the organization.

The three approaches are based on a common notion that important characteristics of organisational culture can be viewed as properties comprising distinct variables that reflect measurable dimensions (Likert, 1967; Schein, 1990).

This study focuses on an effectiveness profiling instrument, which is therefore described in more detail. According to Gordon and DiTomaso (1992), most empirical research has attempted to relate organisational culture to organisational outcomes through an effectiveness trait approach, described by Saffold (1988) as a focus on values that are thought to produce a 'strong' culture. Others, such as Kotter and Heskett (1992), Schein (1985) and Weick (1985), however, have disputed the idea that a stronger organisational culture is necessarily better; they argue that the relationship is contingent on environmental factors. However, effectiveness profiles still constitute an important category of organisational culture measures.

Ashkanasy *et al.* (2000a) describe a few effectiveness profiling approaches:

- Harris and Moran's (1984) survey is the first example of an effectiveness profiling approach. The instrument focuses on the effectiveness of managers and the organisation, including leadership and communication

- Sashkin and Fulmer's (1985) instrument describes the values they measure as those that must be present for the work to get done. These values include attending to people, managing 'hands-on' and believing in a common organisational philosophy.

- Woodcock's (1989) instrument focuses on actions required by management to achieve organisational success. In this instance, strongly held values are seen to be essential to organisational effectiveness.

The literature reveals that little significant development of new survey measures has taken place since 1992. A notable exception is the GLOBE instrument developed for a large cross-national study of organisational culture and leadership as set out in Ashkanasy *et al.* (2000a). The instruments included in the research done by Ashkanasy *et al.* (2000a) represent the work of both academic researchers and consultants. These instruments were published over an 18-year period and were reported in academic journals and popular books. The levels of organisational culture at which they are targeted vary from behaviours to beliefs and values. The instruments vary in format, although most use Likert-style response scales. In terms of validity and reliability, however, only the instruments offered by Cooke and Lafferty (1986) and O'Reilly *et al.* (1991) have been reported as being reliable and possessing consensual, construct and criterion validity.

2.6 DEVELOPING AN ORGANISATIONAL CULTURE ASSESSMENT TOOL

DeVellis (1991:1-2) states that in the 'quantification of a particular phenomenon in research where there are either inappropriate or unavailable measurement tools, the development of a measurement instrument seems to be the only option' (which is the case in this study). The social sciences often measure elusive, intangible phenomena derived from multiple, evolving theories and thus pose a clear challenge to research (DeVellis, 1991:7). Knowledge about the specific phenomenon or construct being studied is probably the most important consideration in developing a measurement scale.

Duncan (1984) argues that the roots of measurement lie in social processes and that these processes and measurement actually precede science: 'all measurement…is social measurement. Physical measures are made for social purposes' (Duncan, 1984:35). Whatever the initial motive of measurement, each area of science develops its own set of measurement procedures. In the social sciences, a typical measurement procedure is the use of questionnaires, and the variables of interest are part of a broader theoretical framework (DeVellis, 1991:3).

The literature reviewed in this chapter reveals a variety of often conflicting theoretical positions and a lack of empirical support for many of the measures of organisational culture. The development of an organisational culture assessment tool which is perceived as a valid tool should clearly reflect the emerging research perspectives on organisational culture.

To overcome negative critiques of organisational culture assessment tools and the dimensions to include in the instrument the literature was surveyed from a multi-disciplinary point of view to ensure a thorough theoretical foundation. The model or framework on which the assessment tool developed in this study is based was derived from intensive previous research by Du Plessis (2001).

Scale development is a complex process. Clark and Watson (1995:309-319) discuss validity and the basic issues in scale development. DeVellis (1991:52-80) comments on the development of a scale instrument using eight steps, which are supported by Clark and Watson (1995). The first two steps are concerned with ensuring substantive validity and the remainder are concerned with structural validity.

Step 1: Determine clearly what is to be measured- (the purpose)

- *A thorough theoretical base must be developed as an aid to clarity.*

The conceptualisation of the phenomenon to be tested or the theoretical framework must be clear and the boundaries of the phenomenon must be identified. If there is no theory available to guide the research, a conceptual framework must be developed before developing the scale instrument. A tentative theoretical model, based on a thorough literature review, must be specified to serve as a guide to scale development. Thinking through and not just about the theoretical issues and understanding the underlying constructs prior to entering into the process of scale construction increases the likelihood that the resulting scale will contribute to theory.

- *Specificity is an aid to clarity.*
  A prediction of a general class of definition (broader description) or a specific (narrow) set of measurement must be done. A scale should be developed by determining beforehand what the intended function thereof is, as well as what it is not, and an active decision should be taken about the specific purpose of the instrument. It is not enough to generate a set of items and then see what they look like after the fact. Scale specificity can vary along a number of dimensions, including content domains, setting (specific environment) or population.

- *Be clear about what to include in a measure, as well as* what to exclude. Thus make sure the underlying construct is well defined and focuses on the main purpose.

Step 2: Generate an item pool

The goal is to arrive at a set of items, some of which indicate a high level of latent variable when endorsed and others with a high level of latent variable when not endorsed. Choose items that reflect the scale's purpose. 'Start with 40 items and end with 10 items' (DeVellis, 1991). However, ensure that the

theoretical construct is not lost because of removing items unnecessarily (Hofstede & Neuijen, 1990). Each content area must be well represented in the initial item pool.

This process of item development is referred to as the 'theoretical-rationale or deductive method' of scale development (Clark & Watson, 1995). An ideal to strive for is that every item should be accounted for based on the theoretical construct to ensure content validity. Good scale construction is an evolving and iterative process.

Items should also be written well, ensuring that the items are easy to read and to comprehend.

Step 3: Determine the format for measurement

Usually two dominant response formats are used in assessments, dichotomous 'true-false or yes-no' scales and the Likert-type rating scales. The Likert–type scale is viewed as a more acceptable and appropriate measurement scale, because it provides a wider choice of options and is thus more reliable and stable. A desirable quality of a measurement scale is variablility. Likert-type scales can be used in different response formats; the most popular of these are:

- the frequency format ('never' to 'always')
- the degree or extent format ('not at all' to 'very much')
- the similarity format ('like me' to 'not like me'), and
- the agreement format ('strongly agree' to 'strongly disagree')

The number of response options included in the Likert-type scale also needs careful consideration to fit the research.

Equal number options can result in respondents' falling on one side, whereas midrange options can result in respondents' choosing the middle option.

Step 4: Have initial item pool reviewed by a pool of experts

It is advisable to have the initial item pool validated by a pool of experts who can add value by:

- confirming or invalidating the inclusion of an item;
- evaluating the items' clarity and conciseness; and/or
- pointing out ways to expand items.

Lawshe's (1975:563-575) quantitative approach to the content validity of items can be applied. The judgment of experts in the field who are subject matter experts is regarded as the highest authority to challenge the 'purported content validity of the test'.

The formula for content validity is expressed as a ratio, the 'content validity ratio, CVR'.

$$CVR = \frac{n_e - N/2}{N/2}$$

Where;

n_e = number of respondents who indicate the item as essential

N= the total number of respondents

The CVR is negative if fewer than half say an item is 'essential', and positive when more than half say it is 'essential'. Thus, the more respondents over 50%, perceive the item as 'essential', the greater the extent or degree of its content validity.

Therefore the content validity ratio (CVR) is an item statistic that is useful in the rejection of specific items from the initial item pool and the computation of the content validity index (CVI) for the whole item pool (the mean of the CVR values retained in the test).

Step 5: Consider the inclusion of validation items

Ensure that the items are valid by conducting applicable validity tests to check:

- content validity (representative sample of items);
- criterion validity (predictive validity, which is more a practical than scientific validity); and
- construct validity (theoretical relationship of a variable to other variables).

Step 6: Administer the items to a development sample

Include the validated items in the questionnaire, together with new items (if applicable) and send the questionnaire out to a sample of subjects. The sample size recommended by DeVellis (1991) as well as Clark and Watson (1995) is around 300 respondents. Make sure the sample is representative of the population under study.

Step 7: Evaluate the items

Evaluate the items to determine which ones to include or retain from the item pool. An inter-item correlation of 0.15 to 0.5 is recommended. The ultimate goal of scale development according to Clark and Watson (1995:316) is to maximize validity rather than reliability. Internal consistency reliability is concerned with the homogeneity of the items comprising a scale and is typically equated with the Cronbach's coefficient alpha, α. Item-scale correlation indicates to what degree items inter-correlate with each other. The items with an alpha correlation of 0.70 and higher are viewed as acceptable regarding reliability, the nearer to 1 the better. If the alpha is negative, something is wrong and reverse scoring or a deletion is advisable.

Step 8: Optimise scale length using factor analysis

At this stage the pool of items should demonstrate acceptable reliability. Factor analysis should be used to optimise the scale length.

Factor analysis is described by Hair, Anderson, Tatham, and Black (1998) as 'a generic name given to a class of multivariate statistical methods whose primary purpose is to define the underlying structure in a data matrix'. Thus its purpose is to construct common underlying dimensions in which the individual items can be grouped. Factor analysis could have an exploratory or confirmatory perspective. Exploratory Factor Analysis (EFA) is useful in searching for structure among a set of variables. Confirmatory Factor Analysis (CFA) assesses the degree to which the data fits the expected structure, as supported by literature or prior research. The stages in factor analysis are clearly depicted and discussed in Hair *et al.* (1998) and shown in Figure 2.8. (The process steps followed in this study are indicated in colour).

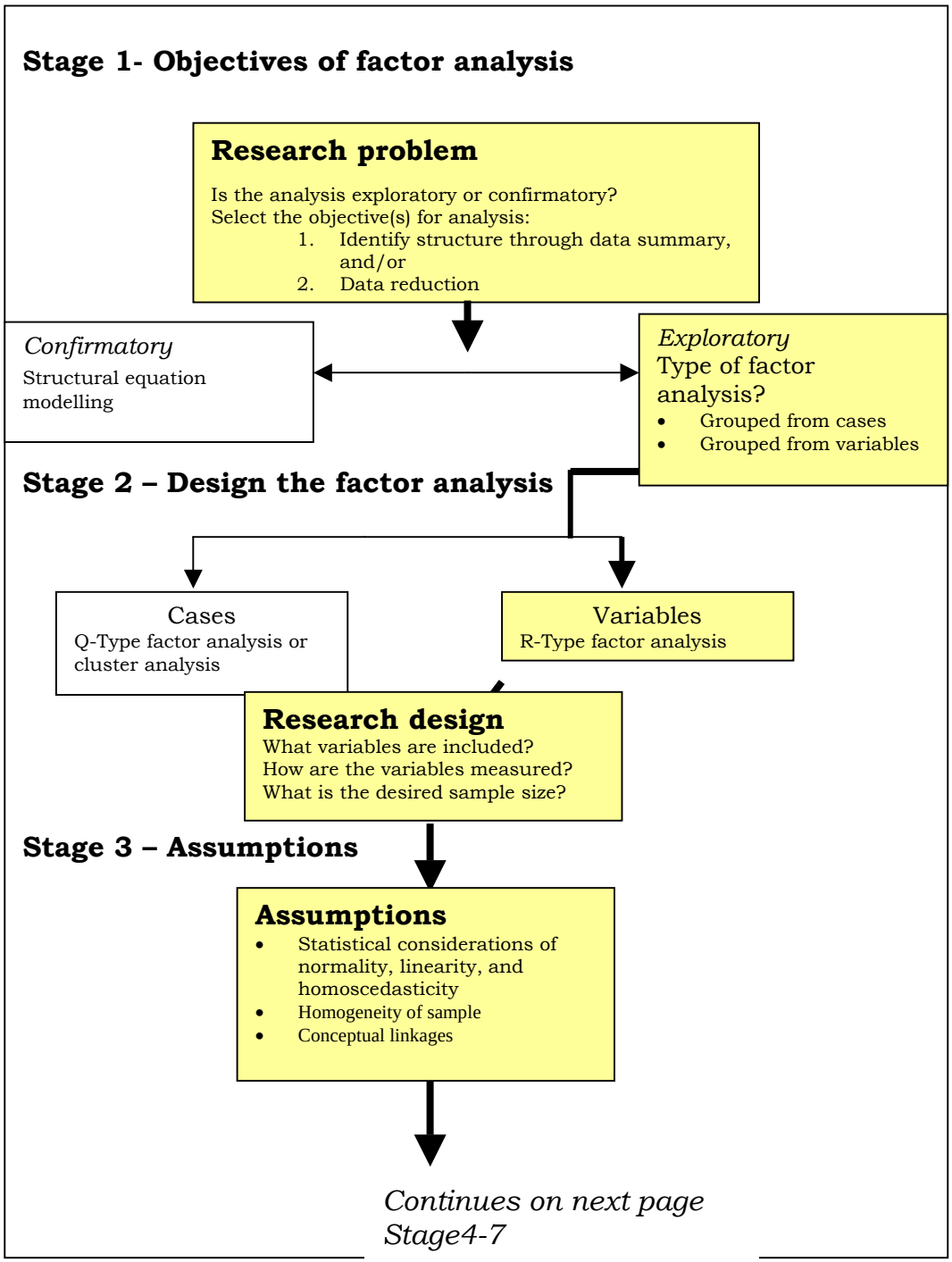
Stage 1- Objectives of factor analysis
Research problem
Is the analysis exploratory or confirmatory?
Select the objective(s) for analysis:
1. Identify structure through data summary, and/or
2. Data reduction
Confirmatory
Structural equation modelling
Exploratory
Type of factor analysis?
Grouped from cases
Grouped from variables
Stage 2 – Design the factor analysis
Cases
Q-Type factor analysis or cluster analysis
Variables
R-Type factor analysis
Research design
What variables are included?
How are the variables measured?
What is the desired sample size?
Stage 3 – Assumptions
Assumptions
Statistical considerations of normality, linearity, and homoscedasticity
Homogeneity of sample
Conceptual linkages
Continues on next page
Stage4-7

Figure: 2.8 continue

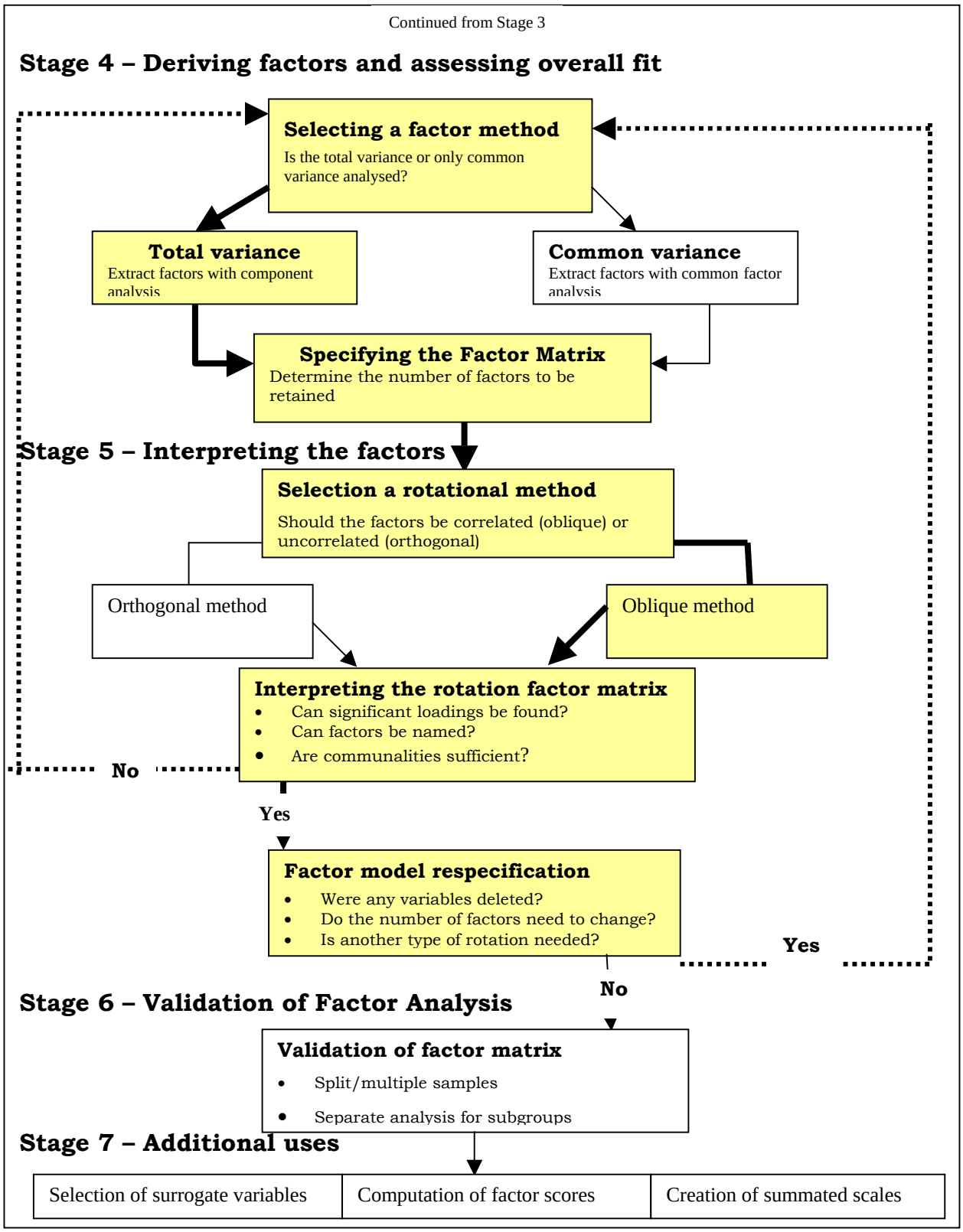

Figure: 2.8: Factor analysis stages 1-7 (adapted from Hair *et al.*, 1998:95-101)

Factor analysis generally requires the number of cases to be much larger than the number of variables, although various authors remain vague on the allowable limit: 'Unfortunately, nobody has yet worked out what a safe ratio of the number of subjects to variables is' (Gorsuch, 1983:332). A ratio of five to ten subjects per item is advised by DeVellis (1991). Kaiser's eigenvalue rule is used to extract the factors that explain more variance. Eigenvalues higher than 1.0 can be considered for the inclusion of a factor.

The reason for wanting a large number of subjects is that factors can become unstable and unduly dependent on the whims of individual respondents. To avoid such pitfalls it is therefore wise to keep the number of factors small, - much smaller than the number of cases and smaller than what is technically possible based on 'eigenvalues' larger than 1.0. Also, one should only consider variables with high loadings on a factor, say over 0.50 or 0.60. However one should keep the underlying theoretical construct in mind (Hofstede & Neuijen, 1990).

2.7 CONCLUSION

The literature studied in this chapter provides a solid foundation for this study and provides information to answer some of the questions and objectives stated in Chapter 1 (see below), as well as substantive information to facilitate the research process involved in the scale development.

- *Is a project management culture, as an operational organisational culture, able to contribute towards business success in organisations that use project work?*

The literature states that organisational culture does contribute towards business success (Turner & Simister, 2000; Ashkanasy, Wilderom, & Peterson, 2000b; Kotter & Heskett, 1992; Furnham & Gunter, 1993), and

that project culture does contributes towards project success (Cleland, 1994; Lientz & Rea, 1999; Gray & Larson, 2000).

- *Is the measurement of organisational culture, and project management culture necessary?*

The measurement of work-based values and corporate culture is central to business improvement and sustainability. If one cannot measure something one cannot monitor its progress as part of organisational management and business process improvement (Maullin & Townsend in http://www.cfoweb.com.au/stories). Knutson (2001) supports the measurement of project management in organisations, because it can result in prolonged utilisation of the philosophy, principles and practices of project management and therefore sustain the profession of project management.

- *What should a supportive organisational culture for optimal project success consist of? (What are the components/elements of a project management culture?)*

Du Plessis (2001) has defined the concept of 'project management culture' and the associated descriptive elements by conducting a triangulation study which includes three phases (Phase 1: Literature Study; Phase 2: Qualitative Dimension-Questionnaire; and Phase 3: Concept Mapping technique).

Sufficient qualitative information was gathered from this research to define the concept 'project management culture' and associated descriptive elements in both a narrow and broad sense. However, the framework of descriptive elements is being verified and analysed by experts, in this case, experienced in the field of project management, as relevant for inclusion in a project management culture assessment tool. The verification and analyses

of the framework and descriptive elements will be discussed in Chapters 3 and 4.

- *How should organisations (those currently engaged in and those that want to apply project work) assess their project management culture?*

Project management is regarded as a holistic and interdisciplinary field, applied in an open system of multiple interdependent parts (sub-systems). The open systems approach (von Bertalanffy, 1950) offers a holistic approach, but also emphasises the interdependence between the different sub-systems and elements in an organisation which is regarded as an open system (French & Bell, 1995). The systems model explains the interaction between organisational sub-systems (goals, structure, management, technology and psycho-sociology). This complex interaction, which takes place at different levels, between individuals and groups within the organisation, and with other organisations and the external environment, can be seen as the primary determinant of behaviour in the workplace. The patterns of interaction between people, roles, technology and the external environment represent a complex environment which influences behaviour in organisations (Martins & Terblanche, 2003:65). In multiple levels these behaviours influence performance and the operating culture of the business, as well as the operating culture in which projects have to deliver outcomes. The operating cultures of organisations can be regarded as a direct function of the assumptions and values shared by members and as important determinants of individual and organisational performance (Ashkanasy *et al.*, 2000).

The key project deliverables are usually measured against specific objectives pertaining to time, cost and quality - the classic project management performance triangle (Turner & Simister, 2000:799), which is technically

biased and not supportive of the holistic approach. The reason for this is that organisational culture in a project environment or a project management culture is new to the field of project management and organisational behaviour. An applicable holistic organisational culture assessment tool has not yet been developed. Such an assessment tool would assist organisations in determining their present compliance or gap with regard to a project management culture from a holistic, open systems point of view, as well as provide a framework of guiding principles to develop a project management culture that could support project work.

In Chapter 3, the rationale for the research methodology is discussed and supported with reference to the relevant literature.

CHAPTER 3

RATIONALE FOR METHODOLOGY USED

The important thing is not to stop questioning. Curiosity has its own reason for existing. One cannot help but be in awe when he contemplates the mysteries of eternity, of life, of the marvellous structure of reality. It is enough if one tries merely to comprehend a little of this mystery every day. Never lose a holy curiosity.

Albert Einstein (1879-1955)

3.1 INTRODUCTION

This chapter describes the rationale for the methodological approach followed in Chapter 4: (Research methodology and method).

3.2 THEORETICAL FRAMEWORK

The value of research is diminished if all the relevant aspects have not been taken into consideration throughout the research conducted. Thus, to conduct thorough research a project management approach has to be adopted in this study too. The research process will follow the project lifecycle phases, to ensure that all the necessary detail in each phase is carefully thought through, and that a clear conceptualisation of the entire process has been accomplished. The research project phases include:

- the research design phase;
- the research planning phase;
- the research implementation phase; and finally
- the closure phase.

Each of these phases needs to be thoroughly planned to maximise focus and ensure the successful completion of the research project.

What is good research? Good scientific research generates dependable data, derived from practising professional conduct that can be used for decision-making (Coopers & Schindler, 2001:16). Kerlinger (1986) argues that the characteristics of good scientific research should include the following:

- a good integrating theory;
- public and open procedures;
- precise definitions;
- a systematic and cumulative approach;
- replicable findings;
- objective data collection and sampling;
- a clear statement of the research problem; and
- a clear understanding and explanation of the phenomenon/phenomena studied should.

Good research thus follows the standards of the scientific approach, which follows the phases of scientific method along the project lifecycle as indicated in Table 3.1.

Table 3.1: Characteristics of good scientific research applied along the project lifecycle

Characteristics of good research (Coopers & Schindler, 2001:16-18)	**Project lifecycle stages**
Purpose clearly defined	Initiation Phase
Research design thoroughly planned	Planning Phase
Limitations revealed	Implementation Phase
High ethical standards applied	Implementation Phase
Adequate analysis	Implementation Phase
Findings presented unambiguously	Implementation Phase
Conclusions justified	Closure Phase

This research attempts to follow the scientific approach described above and to comply with the criteria in the detailed description of qualitative and quantitative research outlined in Chapter 4, figure 4.1.

Science is derived from specific schools of thought, and grouped into human institutions, (in this instance project management and organisational behaviour) as scientific communities supportive of each others' thoughts and perceptions along a continuum between essentialism and relativism called Positivism and Interpretivism respectively in Organisational Behaviour research. This is set out in Figure 3.1. This research is a combination of positivism and interpretivism.

Figure 3.1 describes the philosophy of this research, a combined positivist (modernist) and interpretivist (post-modernist) approach and where it fits into the scientific framework of 'hard science' (epistomology) and 'soft science' (metaphysics).

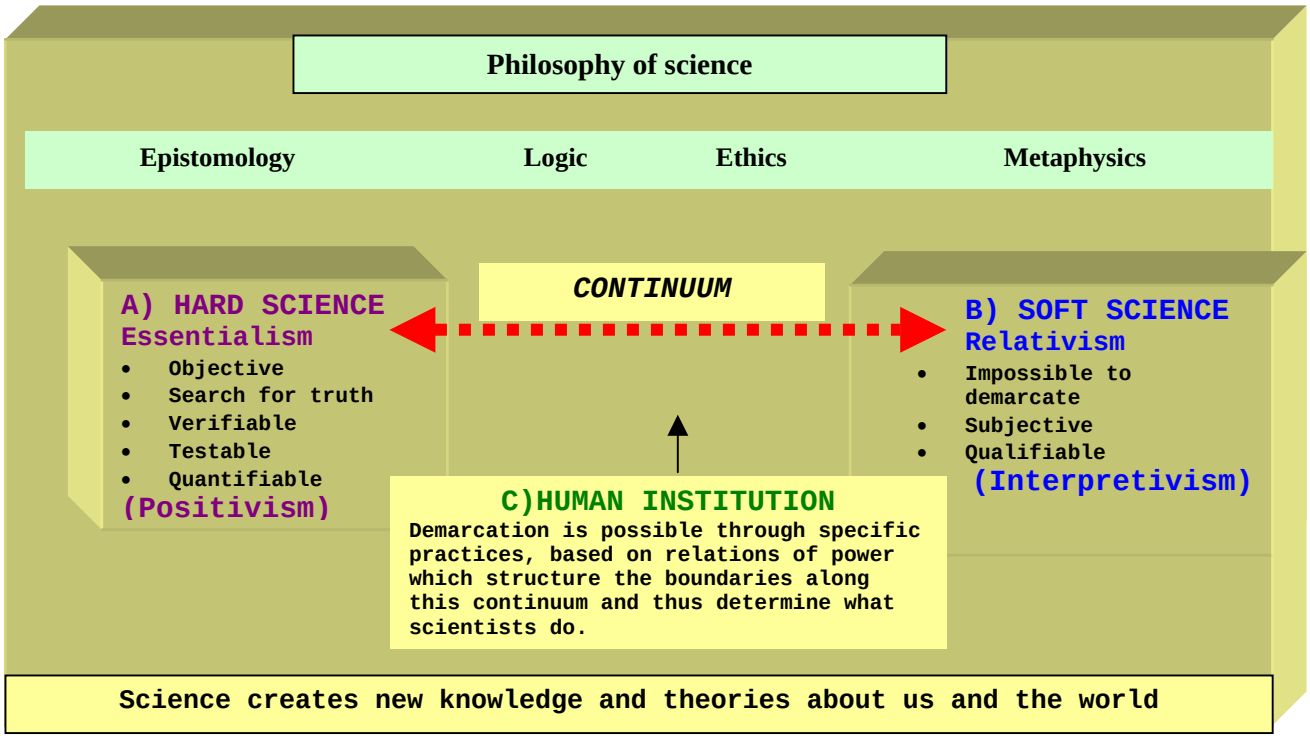

Figure 3.1: The philosophy of science and fit of this research

This research is dominated by the post- modernist construct, that describes the cosmos as unstable, relative, complex, open (holistic) with humans as a small but an inextricable part of the greater reality. Furthermore, post-modernism can be characterised by science within chaos, scarcity, with truth subjected to value systems and the importance of relationships.
In post-modernist thinking,

- human beings are seen as relational beings;
- the universe (or nature) is seen as a dynamic organism;
- science accepts chaos and is qualitative, and
- development and progress focus on scarcity and limitations (Blignaut, 2001).

If the two mainstream scientific approaches are quantitative and qualitative approaches and the two main paradigms are modernism and post-modernism, then most of the earlier research attempts in organisational behaviour as a discipline must be described as having been approached using a quantitative approach in a modernistic paradigm. This was and in certain instances still is mainly due to pressure on scientists to ensure that research is testable. However, since the early 1990's the post-modernist paradigm (where organisational behaviour fitted originally) has evolved and approaches to science have become more qualitative. However, the theory building process used within this discipline actually draws its methodology from both paradigms as set out in Figure 3.2.

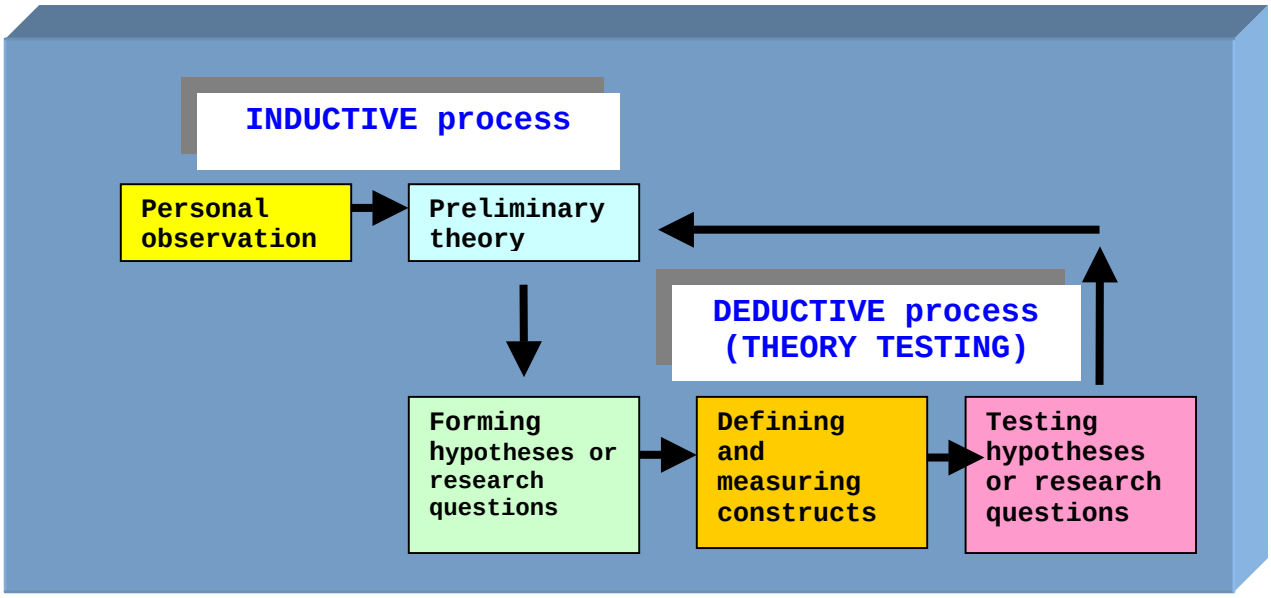

Figure 3.2: Theory building and testing process (McShane & von Glinow, 2003:604)

The two general approaches to reasoning which may result in the acquisition of new knowledge are:

- *inductive reasoning*, which commences with the observation of specific instances, and seeks to establish generalisations (also known as the scientific approach or theory building); and
- *deductive reasoning*, which starts with generalisations, and seeks to see if these generalisations apply to specific instances (also referred to as theory testing) (Guy, *etal.*, 1997; McShane & von Glinow, 2003:604).

Both qualitative and quantitative approaches are applied in this research, as well as inductive reasoning and deductive reasoning.

The quantitative and qualitative research approaches and the research methods used in this study are outlined in Chapter 4. It has to be emphasised that it is not a case of following an either/or methodology, the two approaches can be combined. This is also referred to as a multiple approach or triangulation (use of several research frames of reference to

analyse the same set of data (Leedy, 1993:143). This theoretical framework provides the background to the research decisions applicable in the present study.

The easiest way to depict the specific research design and methods used for the different research questions is to construct a diagram (see Figure 3.3 overleaf) utilising the theoretical framework provided above.

Research question	Approach and method	Reasoning
1. Is a project management culture, as an operational organisational culture, able to contribute towards business success in organisations that use project work?	Literature study Descriptive Qualitative	Inductive
2. Do businesses regard the measurement of organisational culture and project management culture as necessary or value-adding to business?	Literature study Descriptive Qualitative	Inductive
3. What should a supportive organisational culture for optimal project success consist of ? (What are the components/elements of a project management culture?)	Literature study Qualitative questionnaire Quantification of dimensions and elements- verification by experts using Lawshe's (1975) content validity technique	Deductive
4. How should organisations (those currently engaged in and those that want to apply project work) assess their project management culture? *What process should be used to develop a holistic organisational culture assessment tool that can be used to assess the project management culture (as an operational culture) in organisations?*	Literature study on measurement and scale development. Qualitative orientation Quantitative verification and development of assessment tool. DeVellis (1991) scale development process Item analysis and exploratory factor analysis Pilot study- testing project management assessment tool	Inductive Deductive

Figure 3.3: Methodological approach used in this research study

Thus, in conducting this research study, a combination of qualitative and quantitative approaches is used based on a sound literature review provided the theoretical base. Both inductive and deductive processes are used. To ensure that the study complies with the criteria for good scientific research, the guidelines mentioned are applied.

3.3 LIMITATIONS AND SHORTCOMINGS IN PREVIOUS RESEARCH

There have been several obvious weaknesses in previous research and discussions on project management culture and organisational culture assessment tools. These discussions lack an explicit theoretical framework which takes into account the complexity of the interdisciplinary and systemic nature of a project management culture. Their procedures for listing some values and beliefs as dimensions of a project management culture are often subjective and they lack prior criteria for the inclusion or exclusion of some dimensions and a basis for naming and grouping them. Also, except for Wang (2001), they do not provide any systematic and empirical survey research, on project management culture. To address these weaknesses in the literature and to promote a project management culture as an important operational culture in organisations involved in project work, it is essential to study project management culture as a holistic, systemic phenomenon, using a sound theoretical framework and empirical data.

De Witte and van Muijen (1999) have expressed their concern about researchers and practitioners of organisational culture's failing to address a number of crucial aspects in conducting their research. They have indicated a range of the critical questions, which should be taken into account by every researcher in organisational culture. These critical questions are the following:

- Is organisational culture the right concept for the research?
- Which definition or approach to organisational culture will be used?
- What are the dimensions and domains of organisational culture?
- Which culture(s) does the researcher intend to study (national, organisational, departmental or professional)?
- What is the appropriate research method?
- At which level should the data gathered be analysed?
- What is the ideal culture for an organisation?

This research has taken these questions into account throughout the research process.

The limitations and shortcomings of previous research dealing with the development of measurement tools are briefly summarised below.

Wells (1993) criticises the research methodologies traditionally adopted in social science on several counts. A number of the criticisms stem from researchers' over-reliance on quantitative methods - a lack of richness in theorising, a lack of theory testing in natural settings, the continued dominance of one-shot investigations, and the use of sophisticated correlational methods to imply causality.

3.3.1 Lack of integrating theory

Deshpande (1983) has criticised scholars for being insufficiently involved in theory generation; the methods social science has historically developed are those best suited to confirming theories rather than to discovering them.

3.3.2 Methodological problems

Research in the social sciences has historically emphasised *deductive processes* - in many cases, applying these processes prematurely, before an adequate understanding of the underlying concepts operating has been developed (Deshpande, 1983).

In organisational behaviour, there are too many variables for research to be anything other than the exercise of contextual judgement in situations. However, the scholarly organisational behavioural community, including researchers, educators, publishers and consultancies, has encouraged a statistically-driven research approach more suitable to 'hard science' than a multivariate social science such as organisational behaviour. One can, of course, very easily measure whether statistically-driven research is statistically sound or not. However, 'statistically sound' does not equate 'good'. Researchers tend to value what they can measure, but in research, as in the rest of practice, researchers need to learn to measure what they value (Adler, 1983). Thus the main problem lies with the representational relation between what is represented and the object, for example, questionnaire responses vs. respondents' attitudes to what has been said vs. what was meant.

3.3.3 Development of measuring instruments

It is advisably to start measuring organisational culture with a qualitative orientation and followed up by a quantitative verification (Hofstede & Neuijen, 1990).

Locatelli and West (1996:13) suggest that researchers are still somewhat blind to the nature of the concept of organisational culture and its sub-dimensions and that there is a clear need for consistency in the definition of

and operationalisation in this field. They describe organisational culture researchers as 'blind researchers amongst elephants'. Researchers should carefully consider the methods they use to access culture, since there are clear differences in the amounts and types of data generated by different methods. Some researchers advocate the use of only qualitative methods (Everard & Louis, 1981); while others believe that culture can be assessed objectively by means of questionnaires (for example, Tucker, McCoy, & Evans, 1990). The type of methodology deemed appropriate depends largely on the operational definition of culture used by the researchers and the purpose of the research (Ashkanasy *et al.*, 2000a). If organisational culture is defined as espoused beliefs and values, a myriad of straightforward research tools are available for use from the human relations school. These include questionnaires, inventories and structured individual and group interviews. If one accepts that there can sometimes be significant differences between espoused values and values in use (Argyris & Schon, 1978), then quantitative questionnaire approaches must be rejected. Instead, qualitative research methods are called for.

3.3.3 Rationale for specific techniques

Zamanou and Glaser (1994) note that is a lot of inconsistency in the conceptualisation of organisational culture. The uniqueness of organisational cultures has resulted in researchers' employing a variety of quantitative and qualitative measures to tap the idiosyncrasies of the culture they are studying. Rousseau (1990a) suggests that the 'method appropriate to assessing culture depends on those elements we choose to examine'.

Evert Gummesson (2000:1) writes: 'Qualitative methodology and case studies provide powerful tools for research in management subjects, including general management, leadership, marketing, organisation, corporate strategy, accounting, and more'. From Gummesson's comment it should be

clear that qualitative research is useful in an interdisciplinary field. As Denzin and Lincoln (2000:7) indicate, 'the field sprawls between and crosscuts all of the human disciplines, even including, in some cases, the physical sciences', as is the case in this study.

The statistical techniques and processes that are used in this study are directly related to scale development. They are the following:

- the scale development process of DeVellis (1991), confirmed by Clark and Watson (1995);
- the quantitative content validity technique of Lawshe (1975);
- item analysis using SAS (1997); and
- the exploratory factor analysis (EFA) technique using BMDP (1993)(Hair *et al.*, 1998; Garson, 2002).

3.4 CONCLUSION

The complexity of the research methodology and method to be used in the interdisciplinary study fields of organisational behaviour and project management combined with organisational culture is evident from the discussions in the chapter. One has to be aware of the pitfalls and limitations when conducting research of this nature. The rationale and theoretical construct set out in this chapter is used as a basis for the research design and method set out in Chapter 5.

CHAPTER 4

RESEARCH METHODOLOGY AND METHOD

If we knew what it was we were doing, it would not be called research, would it?
Albert Einstein (1879-1955)

4.1 INTRODUCTION

Qualitative and quantitative approaches are applied in this research, as well as inductive and deductive reasoning. In any good quantitative research a map or framework of thirteen set steps is typically followed, in four distinct phases (conceptualisation, instrumentation, information gathering and closure). The validity of each step is important as indicated in Table 17.1 in Mouton (1996:111). The phases of qualitative research differ from those of qualitative research except for the conceptualisation phase. The steps in qualitative research also differ from those of qualitative research, because it is an evolving process of material (data) discovery, description and understanding. Figure 4.1 (adapted from Mouton and Marais, 1988; Neuman, 2000 and Babbie & Mouton, 2001) clearly indicates the integration of the qualitative and quantitative approaches followed in this research, and the conceptualisation and empirical research phases (see Figure 4.1).

4.2 RESEARCH DESIGN

Hofstede and Neuijen (1990) suggest that measuring organisational culture is 'advisably started with a qualitative orientation and then followed up with a quantitative verification. Determine which operationalisable and independent dimensions can be used to measure them, and how do these dimensions relate to what is known about organisations from existing theory and research'.

The complexity of the construct and research questions in this study necessitated the use of a triangulation approach (multiple methods). This

research was therefore designed in four stages (see Figure 4.2). The four stages can be briefly described as follows:

- **A literature study** was done to comprehend the context of the multidisciplinary fields involved and to provide a clear theoretical framework as the basis of which the desired project management culture assessment tool could be developed.

- **Verification of the project culture dimensions** and elements identified by Du Plessis (2001), by project management experts was done. This stage involved the use of a qualitative perception questionnaire, *(*Addendum A: Relevance questionnaire - Project Management Culture) and some means of quantification utilising Lawshe's (1975) quantitative approach to content validity.

- **The project management culture assessment tool** was developed utilising research inputs from previous researchers as mentioned in the literature (see Chapter 2) and the rationale for the methodology used (see Chapter 3). (Also see Addendum C: Project Management Culture Assessment Tool).

- **The final construct, assessment tool,** was tested as a pilot study in two organisations. One organisation (A) is renowned for successful project work and customer satisfaction over a number of years. Their employees are trained in and are actively practicing project management and was assumed to have a project management culture. The other organisation (B) is relatively new in the project management field, with little training and has not been able to get project work implemented successfully and thus was assuming not to have a project management culture. This test was designed to indicate whether the project management culture

assessment tool is able to distinguish between an organisation with a project management culture or not, and whether it can can be utilised as a reliable diagnostic tool.

(see Figure 4.1 on overleaf)

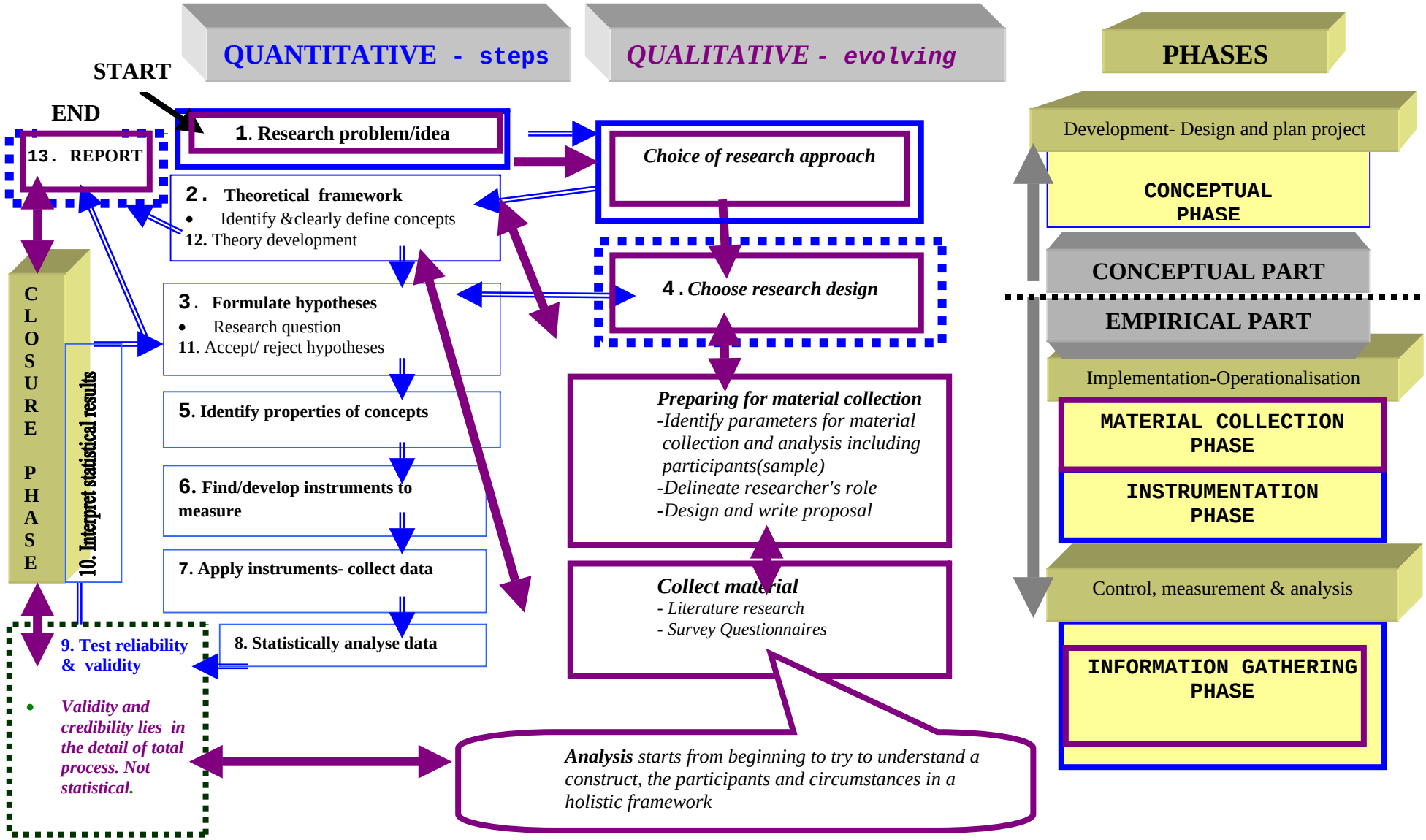

Figure 4.1: Integrated process using quantitative and qualitative research approaches

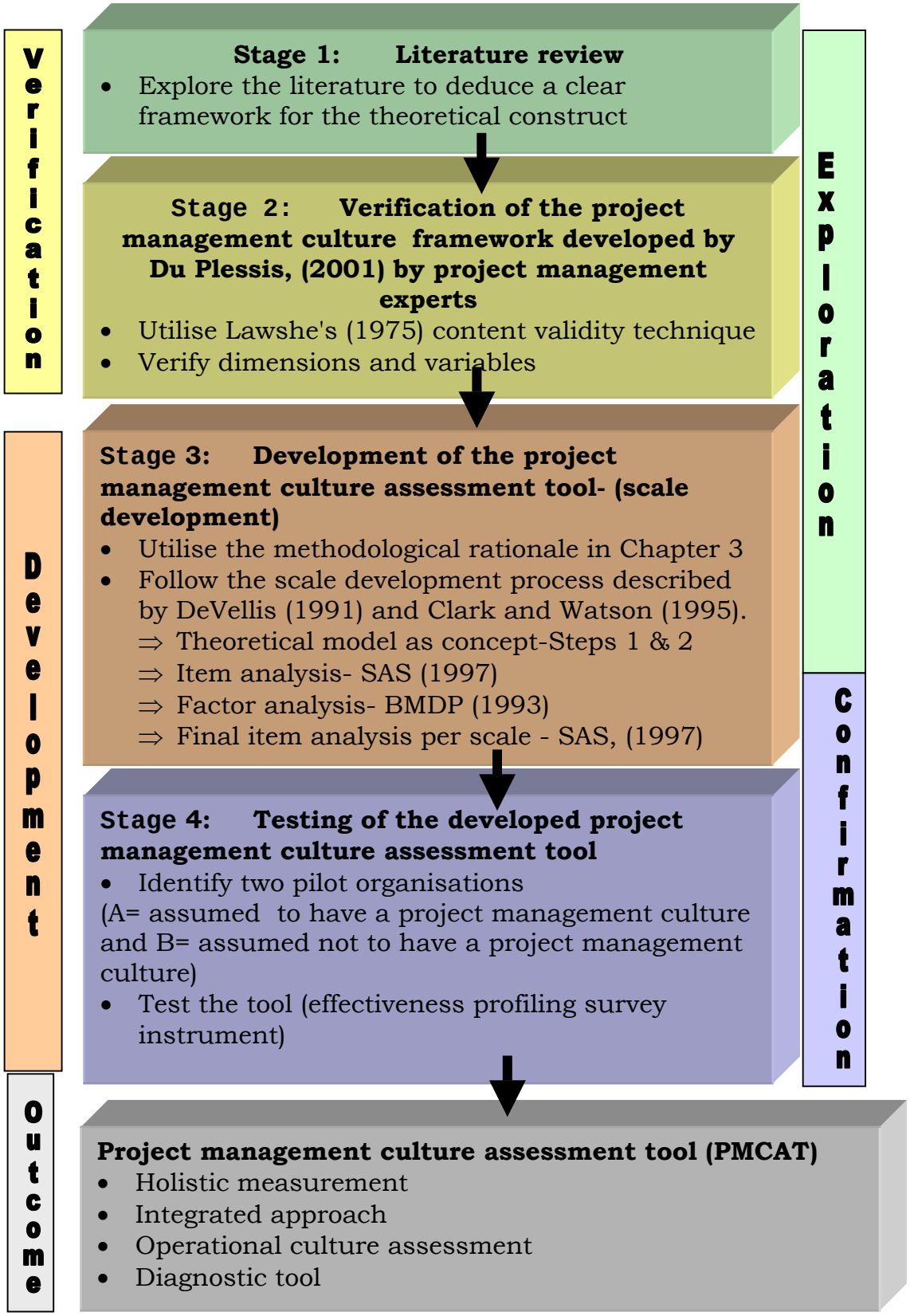

Figure 4.2: Research design and process

The research design can mainly be classified as an exploratory and confirmatory study. The research started with an exploration of existing literature. A qualitative perception questionnaire (Addendum A) was employed to verify the data, using project management experts in terms of Lawshe's (1975) content validity technique previously researched by Du Plessis (2001) on the key dimensions and descriptive elements of a project management culture. The confirmatory part of the research consisted of a quantitative study using the survey method and an analysis of the factors and constructs of the assessment tool.

An effectiveness profiling survey assessment tool, as described in Chapter 2, was developed (such a tool has been cited by numerous researchers as contributing favourably to quantitative techniques in general). The nature of survey methods render them especially useful for organisational culture research (Lewis, 1996b; Ashkanasy *et al.*, 2000a).

4.3 PARTICIPANTS AND SAMPLING

The empirical part of this study has two parts and therefore two different sampling groups were used:

- the *verification part* to check the project management culture dimensions and descriptive elements as identified in a previous study by Du Plessis, 2001; and
- the project management culture *assessment tool development part* (see Figure 4.2).

The *verification part* of the study made used a pool of 70 practising project managers and academics in project management from various organisations (South African industries and universities). These individuals practice project

management from a technical, process and research point of view and are thus not just from traditional project management, for example engineering firms. Participants were chosen non-randomly. A criterion in the participant selection was that all the participants had to be involved in project management, either as project managers or as project team member for at least five years. All participants received the same qualitative perception questionnaire (see Addendum A). Of the 70 questionnaires sent out, 52 were returned unspoiled. The number of responses (n=52), represents a 74% response rate.

The *assessment tool development part* used a pool of 494 practising project managers and experienced project team members who were non-randomly chosen from a database of students who had attended post-graduate project management training, between 1999-2001, at the University of Pretoria and who are working in project environments. The textbooks on factor analysis generally require the number of cases to be much larger than the number of variables, although they remain vague on the allowable limit: "Unfortunately, nobody has yet worked out what a safe ratio of the number of subjects to variables is" (Gorsuch, 1983: 332). The rule of thumb in scale development is that approximately 300 responses are necessary to factorise items successfully (DeVellis, 1991). However, since the items in the questionnaire were divided into sub-scales on the basis of the theoretical model the number of responses could be less than 300 (the 'rule of thumb' often used is five reponses per item). The maximum number of items per sub-scale was 48; therefore the minimum number of responses needed was 240 (5x48). Of the 494 questionnaires sent out, 236 were returned unspoiled. The number of unspoiled responses (n=236) represents a response rate of 48%. This number of responses was adequate to continue with scale development. The process steps in scale development indicated by DeVellis (1991) and supported by Clark and Watson (1995) as discussed in

Chapter 3 were used and are described in the research procedure (see point 4.4) in this chapter.

The testing of the scale instrument to be developed involved selecting two organisations that were engaged in project management. One organisation (A) is perceived as doing well in project management and has been involved in conducting successful projects for more than ten years. The other organisation (B) is perceived as not doing so well in project management and has only started with project work in the last year.

4.4 RESEARCH PROCEDURE

As was indicated earlier in this chapter this research consisted of two distinct phases namely: conceptualisation and empirical work (see Figures 4.1.and 4.2), which was clarified and integrated with the scale development process of DeVellis (1991), supported by Clark and Watson (1995).

The first five steps in DeVellis's (1991) process were completed during the conceptualisation phase and the verification process described below. Thus identifying the purpose, setting up the initial items from theoretical base, deciding on a format for measurement, the collection of the initial item pool and the validation of the items were completed.

4.4.1 The conceptualisation phase

The literature was researched (as discussed in Chapter 2) and deductions were made as to the construct of the questionnaire, based on a sound initial theoretical model.

4.4.2 The empirical phase

4.4.2.1 Verification of the data by experts

Data was gathered from project management experts by means of a qualitative perception questionnaire (Addendum A), based on a sound initial

theoretical model of the dimensions and descriptive elements of a project management culture identified in a study by Du Plessis (2001).

The questionnaire (Addendum A) was completed anonymously by 52 out of 70 experts who had received the questionnaire either by hand or by electronic mail.

Data was analysed by using Lawshe's (1975) content validity technique (discussed in Chapter 3). The validity of the items at this stage of the research was ensured by applying

- content validity to ensure that the sample of items are representative of project management culture as perceived by experts; and
- criterion validity to ensure that the items are practical and reflected the theory.

4.4.2.2 Development of the project management assessment tool- scale development

Steps 6 to 8 of DeVellis (1991) were followed as described below:

4.4.2.2.1 Step 6: Administer items to a development sample

A survey questionnaire comprising of 135 items (see Addendum B) was formulated on the basis of the feedback and data received from experts (see step 5 of DeVellis's process), complying with the theoretical construct and project management culture model with dimensions identified by Du Plessis (2001).

The items were formulated in such a way that they were easy to understand and clearly supported the theoretical model.

A Likert-type rating scale, with an unequal 1-5 agreement format, was chosen. It was noted that the mid-range option of 3 in the scale could lead to respondents choosing the middle option; however, equal number options could have resulted in respondents' falling to one side.

Data was gathered by distributing the survey questionnaire (see Addendum B) either by electronic-mail or by hand to the representative sample group of 494, of whom 236 responded anonymously.

4.4.2.2.2 Step 7: Evaluate the items - Item analysis

The 236 respondents' data (unspoiled returns) were analysed by means of a mainframe computer, assisted by the statisticians of the Department of Statistics at the University of Pretoria. The statistical programmes that were used are the SAS (1997) and BMDP (1993).

Item analysis on the initial 135 items per construct (theoretical model) was done to determine construct validity by means of a Pearson correlation. Items with an item-scale correlation of ≤ 0.32 were eliminated from the item pool.

4.4.2.2.3 Step 8: Optimise scale length - Factor analysis

Each of the four theoretical constructs (Project process, People in projects, Project systems and structure, and Project environment) were subjected to exploratory factor analysis (EFA), using the BMDP (1993) to determine the underlying scales or factor structure. The factors indicated on a scree plot with eigenvalues of 1.0 and higher were considered and were further

subjected to factor analysis using Principal Factor Analysis with Direct Quartinim rotation of the items. The sorted rotated factor loading pattern was evaluated and items with a factor loading < 0.35-0.5 (without influencing the theoretical construct of a holistic measurement tool) were eliminated. This is in line with the recommendations of Hofstede and Neuijen (1990). A Cronbach alpha coefficient for each factor was set at >0.7. It is noted that the closer to 1.0 the alpha was, the better, but the theoretical basis of the tool should also be supported as a holistic tool (Clark and Watson, 1995).

The final scale with factors (the test instrument or assessment tool) derived from this research process, was subjected to item analysis to confirm the item correlation and to ensure that item correlations was $\geq$ 0,32.

The assessment tool was then pilot tested in the two independent organisations selected. The pilot test instrument (see Addendum C) in the form of a diagnostic survey questionnaire was distributed by electronic mail or hand delivered to the specific organisations. Each questionnaire was marked as A (organisation A) or B (organisation B) to ensure that the responses would not be contaminated. The mean responses in each data construct, was tested against the other by using the Mann-Whitney t-test.

4.5 CONCLUSION

The research method was followed, based on scientific research as described in Chapter 3. No stumbling blocks were experienced in conducting the research, which indicated that the method was suitable and sound.

The results and findings derived from implementing the research method are reported on and discussed in the following chapter, Chapter 5.

CHAPTER 5

RESULTS AND FINDINGS

Research is the process of going up alleys to see if they are blind.
Marston Bates

5.1 INTRODUCTION

The statistical analysis or empirical part of this study was aimed at providing data that could be used to satisfy the primary research objective described in Chapter 1:

To develop a reliable holistic diagnostic assessment tool for measuring the project management culture, as an operational culture, in organisations.
('Reliable' in this instance refers to the tool's ability to measure what it is supposed to measure and to diagnose an organisation in terms of its project management culture).

The empirical process started with the verification, by project management experts, of the project management culture framework and descriptive elements developed by Du Plessis (2001). This verification was done in support of the answer to the following research question (see Chapter 2):

What should a supportive organisational culture for optimal project success consist of? Thus, what are the components / elements of a project management culture?

5.2 RESULTS AND FINDINGS

The empirical part of this study with the statistical results and findings are divided into and described in three parts. These parts match the research

process (see Figure 4.2: Research design and process) as set out in Chapter 4:

- *verification* of the project management model and descriptive elements by project management experts;
- project management culture *tool development* (scale development); and
- *testing* the 'Project Management Culture Assessment Tool' (PMCAT) for Organisation A (assumed to have a supportive project management culture) and Organisation B (assumed not to have a supportive project management culture).

5.2.1 Verification of the project management model and descriptive elements by experts

Lawshe's (1975) content validity technique was applied to the dimensions and associated descriptive elements of a project management culture as identified by Du Plessis (2001. The results are shown in Tables 5.1 and 5.2. Table 5.1 shows the industry information on the expert sample group. Table 5.2 shows the results on the content validity of the project management culture dimensions and associated descriptive elements as perceived by project management experts.

Table 5.1: Industry information on the project management expert sample group (N= 52)

Type of industry	1. Service (e.g. Banking, Education, Government)			24
	2. Technical (e.g. Engineering/Manufacturing)			28
Type of projects	a. Technical ('hard-side' e.g. production, manufacturing)			22
	b. Non-Technical ('soft-side' e.g. processes, service delivery)			30
Years of project work experience	5-10 yrs 6	11-15 yrs 17	16-20 yrs 19	21 +yrs 10
Qualification	Bachelor's degree 4	Honour's degree 18	Master's degree 24	Doctoral degree 6

The respondents represented both the technical ('hard side') and non-technical ('soft side') of projects. A valid assumption can be made about the balanced representation of technical (54%) and non-technical (46%) industries regarding their viewpoints on the validity of the project management culture dimension model and the descriptive elements. The respondents are all well-qualified: more than 50% have master's or doctoral degrees and more than 80% have in excess of ten years of project experience. One can conclude that they are experts and hence their views are regarded as relevant.

The findings set out in Table 5.2 (overleaf) show that the project environment might not be regarded as such an important dimension in relation to the other three dimensions (project process, people in projects, and project systems and structure). This finding was to be expected, because attention to a holistic view is often neglected in project management, due to a more internal focus on the operational project environment. However, the results from the descriptive elements under the project environment dimension reveals respondents' acceptance of almost all the elements. Thus project environment still seems relevant as a dimension in the model and is not excluded.

Table 5.2: Content validity of project management culture dimensions and associated descriptive elements as perceived by project management experts

DIMENSIONS and descriptive elements of a project management culture	N= Total respondents (52) n_e = Number of respondents CVR= $\frac{ne-N/2}{}$ CVR= Content validity CVR >50% or 0.50 acceptable	
What is the relevance of the following dimensions and elements with regard to contributing towards a project management culture that leads to project success:	**ne Scale 4-5**	**CVR**
A. Process (the manner in which the project is designed, planned, and executed and controlled-monitored).	52	1.0
B. People (project stakeholders).	44	0.85
C. Structure and systems (project methodology).	32	0.62
D. Environment (internal and external).	20	***0.38***
A. The Project process		
1. The project process should be focussed on **results and delivering** unique outcomes.	41	0.79
2. The project process must be **clearly visualised and described**.	36	0.60
3. **Discipline** regarding time, cost and quality is necessary.	44	0.85
4. **Control** should be 'tight' to ensure cost deliverables.	36	0.69
5. **Control** should be 'loose' to ensure flexibility and innovation.	6	***0.12***
6. **Control** is necessary to monitor progress and take necessary action.	45	0.87
7. **Learning and continuous improvement** should be part of projects.	36	0.69
8. Understanding and satisfying **customer needs** are necessary.	44	0.85
9. **Successes** should be determined and built into the **learning process.**	40	0.79
10. **Failures** should be determined and built into the **learning process.**	42	0.81
11. **Communication** should be continuous.	43	0.83
12. Planned **communication sessions** should be conducted to give and obtain feedback.	34	0.65
13. Understanding and applying the **project life cycle** will contribute towards success.	22	0.42
14. The '**work breakdown structure**' should be used to **select** people for the project team.	19	***0.37***

Table 5.2: Content validity of project management culture dimensions and associated descriptive elements as perceived by project management experts (continued)

B. People in projects	**N= Total respondents n_e = Number of respondents CVR= $\frac{ne-N/2}{N/2}$**	
	n_e	**CVR**
1. Project success relies on sound **interpersonal relationships**	44	0.85
2. Stakeholder **commitment** is necessary throughout the project life cycle	41	0.79
3. People in projects should understand the **interdependence** between them	38	0.73
4. Everyone involved in the project should be **disciplined** to deliver according to plan	43	0.83
5. Projects have a **risk propensity** and need people who can take risks without being careless	36	0.69
6. Every member in the project life cycle should have **clear goals and responsibilities**	48	0.92
7. **Power and authority** have to be managed	28	0.54
8. Tolerance for **conflict** is necessary	42	0.81
9. **Interpersonal conflict** should be managed before it becomes destructive	41	0.79
10. An affinity to **learning** is necessary during projects	23	***0.44***
11. Everyone involved in the project must be **results' oriented**	34	0.65
12. There must be **open communication** at all times	48	0.92
13. People must be able to **respond quickly** to project demands	29	0.56
14. Everyone in the project must understand their **role and responsibility**	43	0.83
15. Teamwork is important	50	0.96
16. **Trust** amongst project stakeholders is important	43	0.83
17. Managing **stress** is necessary	31	0.60
18. Team member **credibility** is important	28	0.54
19. People in projects must **understand** the **importance of the project** and how they affect it	48	0.92
20. The project manager should have **credibility** amongst stakeholders	45	0.87
21. **Project leadership** should be focused on creating a competent team to realise project goals	45	0.87
22. Keeping **focus on the project goal** is vital	46	0.88
23. People working on projects must be **technically competent**	30	0.58
24. People working on projects must have sound **interpersonal skills**	33	0.63
25. Competent people should be recruited for the project	43	0.83
26. Team members are carefully **selected** for each project	33	0.63

Table 5.2: Content validity of project management culture dimensions and associated descriptive elements as perceived by project management experts (d)

C. Project structure and systems	**N= Total respondents n_e = Number of respondents CVR= $\frac{ne-N/2}{N/2}$**	
	n_e	**CVR**
1. **Teamwork** is an essential structure for project success.	52	1.0
2. The utilisation of the **organisational structure** should support project work.	34	0.65
3. Team members should be allowed to participate in the development of the project plan.	35	0.67
4. Middle- management involvement in the initial stages of the project should be ensured.	38	0.73
5. **Interdependence** amongst project stakeholders is important.	32	0.62
6. Project activities should be i**ntegrated** with the strategic priorities of the organisation.	38	0.73
7. The project goal should be fully **integrated** with the strategic objectives of the organisation.	33	0.63
8. **Networking structures** play a vital role in project success.	43	0.83
9. **Flexibility** is necessary with regard to structure to ensure optimisation of resources.	42	0.81
10. Delivery of unique project outcomes needs a sound **customer orientation.**	45	0.87
11. The project's future lies in developing **clear goals.**	46	0.88
12. Understanding and utilising **project methodology** and tools are important.	52	1.0
13. The project plan has to be developed with clear milestones.	44	0.85
14. The utilisation of **project management techniques is** essential.	33	0.63
15. **Specifications** have to be developed for each project.	37	0.71
D. Project environment		
1. Management provides **sufficient resources** for the project.	44	0.85
2. Organisational **practices and systems** should enable the project to deliver according to plan.	39	0.75
3. **Top management support** for the project is essential.	36	0.69
4. **Politics and power** should be sorted out or managed before the project commences.	27	0.52
5. Projects **create change** and thus create uncertainty which has to be managed.	38	0.73
6. The customer and external stakeholders' expectations **should be understood.**	46	0.88
7. **Rewards and recognition** should be agreed when goals are set and aligned with organisation policy.	27	0.52
8. **Rewards and recognition** should foster positive performance and motivation.	40	0.77
9. **External changes** should be frequently monitored.	32	0.62
10. Projects implemented in the same **environment influence** each other.	24	***0.46***
11. The project environment encourages **innovation and creativity.**	27	0.52

Sixty-three (63) out of the sixty-seven (67), thus 94%, descriptive elements included in the validity assessment questionnaire of a project management culture (see Table 5.2) have a content validity ratio of higher than 0.50. This shows that the theoretical construct of the project management culture framework and descriptive elements are viewed as valid and thus acceptable and can be used in an assessment tool. These responses answered the following research question: *What should a supportive organisational culture for optimal project success consist of? Thus, what are the components/elements of a project management culture?*

5.2.2 Project management culture tool development (scale development)

The valid descriptive elements derived from the analysis above were used to compile a list of 135 items (variables), which were included in a survey questionnaire (see Addendum B) that was sent out to project managers and team members (as described in Chapter 4 and in Table 5.3).

The biographical information on the sample group is set out in Table 5.3. It is clear from the biographical information that the sample group is well educated and experienced in the field of project management across a broad spectrum of industrial sectors. This also shows that the sample groups' perceptions represented a total industry perspective across various cultural groupings (especially relevant in the South African context).

The results and findings on the development of the project management assessment tool are reported sequentially (as the scale was developed), using the stages described by DeVellis (1991) in Chapter 2 (Literature study) and Chapter 4 (Research method).

Table 5.3: Biographical information on the sample group of project managers and project members (N=236)

Age (years)	**≤ 25**	**26-30**	**31-35**	**36-40**	**41-45**	**46-50**	**51-55**	**55 +**			
	1	54	72	43	35	20	5	6			
Gender	Male = 193				Female= 43						
Economic sector	**Primary sector**	**Secondary sector**	**Tertiary sector**		**Government services**	**Other**					
	18	93	90		28	7					
Qualification	**Std 10**	**Post-school Diploma/certificate**	**Bachelor's degree**	**Honours degree**	**Master's degree**	**Doctoral degree**					
	0	33	85	68	47	5					
Work history (n of years)	**< 6 mo.**	**6 mo -2 yrs**	**2-5 yrs**	**5-10 yrs**	**10-15 yrs**	**15-20 yrs**	**20-25 yrs**	**Over 25 yrs**			
	1	5	35	66	58	42	12	17			
Marital status	**Single**	**Married**	**Divorced**	**Widow/widower**	**Co-habitating**						
	61	164	10	0	1						
Home language	**Afrikaans**	**English**	**isiXhosa**	**thiVenda**	**isiZulu**	**isiNdebele**	**Sepedi**	**XiTsonga**	**Setswana**	**Seswati**	**Other**
	111	78	8	2	11	1	4	1	2	2	14 Italian, Portuguese, Polish,"Indian" German, Dutch, French.
Years as project team member (mean)	7.5										
Years as project manager (mean)	5.8										

5.2.2.1 Item analysis

The initial 135 items (see Addendum B) compiled from the descriptive elements in Table 5.2 were divided into a theoretical construct, based on the four-dimension model developed by Du Plessis (2001), namely:

- Project process;
- People in projects;
- Project systems and structure, and
- Project environment (internal and external).

Each of the four theoretical constructs was subjected to item analysis, using SAS (1997). Table 5.4 shows the number of items within the four-dimension theoretical construct. Tables 5.5 to 5.8 show the specific item analysis per theoretical construct. Table 5.9 shows the descriptive statistics of the respective four theoretical dimensions. Items with a total item correlation of $\leq$ 0.32 were eliminated as per rationale described in Chapter 3.

Table 5.4: Number of items within the four-dimension theoretical construct

1 Project process	**2 People in projects**	**3 Project systems and structure**	**4 Project environment**
40	29	48	18
N of respondents = 236			

Table 5.5: Item analysis per 'project process' construct - dimension 1

Item. No.	Scale item	Item mean	Item var.	Item-scale correlation	N per item
7	*1-1*	*3.271*	*1.003*	***.11***	*236*
10	1-2	3.191	1.044	.44	236
19	1-3	3.466	1.020	.53	236
20	1-4	3.792	1.224	.39	236
23	1-5	3.475	0.809	.64	236
24	1-6	3.339	0.927	.58	236
25	*1-7*	*3.746*	*0.935*	***.21***	*236*
28	1-8	3.566	1.182	.65	236
29	1-9	3.979	0.758	.65	236
32	1-10	3.254	1.181	.70	236
33	1-11	3.144	0.920	.66	236
37	1-12	3.195	1.038	.63	236
39	1-13	3.889	0.566	.52	236
40	1-14	3.508	1.123	.64	236
42	*1-15*	*3.568*	*0.881*	***.27***	*236*
44	1-16	3.370	0.957	.66	236
47	1-17	3.742	0.878	.66	236
52	1-18	3.797	0.730	.61	236
56	1-19	3.958	0.524	.55	236
59	1-20	2.903	1.088	.50	236
61	1-21	3.458	0.723	.44	236
64	1-22	2.869	1.055	.56	236
66	1-23	4.038	0.782	.55	236
69	1-24	2.818	1.268	.61	236
71	1-25	3.856	0.810	.67	236
81	1-26	4.055	0.400	.47	236
82	1-27	3.826	0.754	.65	236
84	1-28	3.665	0.841	.61	236
87	1-29	3.229	1.015	.73	236
95	1-30	3.924	0.579	.66	236
98	*1-31*	*3.047*	*1.290*	***.30***	*236*
100	1-32	3.890	0.734	.66	236
103	*1-33*	*2.686*	*1.419*	***.32***	*236*
106	1-34	3.203	0.840	.59	236
108	1-35	3.627	0.802	.65	236
119	1-36	3.331	0.908	.73	236
120	1-37	3.771	0.939	.67	236
123	1-38	3.805	0.826	.57	236
129	1-39	3.492	0.767	.50	236
136	1-40	3.775	0.776	.55	236

Five items (in bold) have a total item correlation of $\leq$ 0.32 and were eliminated from the item pool, resulting in 35 remaining items which were subjected to factor analysis.

Table 5.6: Item analysis per 'people in project' construct - dimension 2

Item. No.	Scale item	Item mean	Item var.	Item-scale correlation	N per item
4	2-1	3.890	0.564	.49	236
5	*2-2*	*3.746*	*1.130*	***.32***	*236*
6	2-3	3.678	0.744	.53	236
8	*2-4*	*3.258*	*1.361*	***.31***	*236*
15	2-5	3.525	0.953	.70	236
16	2-6	3.250	0.984	.59	236
18	2-7	4.229	0.490	.41	236
26	2-8	3.492	1.013	.54	236
27	2-9	2.686	1.029	.46	236
34	2-10	3.225	0.759	.57	236
48	2-11	3.496	1.114	.63	236
63	2-12	4.144	0.801	.55	236
67	2-13	3.403	0.935	.64	236
72	2-14	3.720	0.862	.60	236
74	*2-15*	*3.661*	*0.521*	***.32***	*236*
75	2-16	3.742	0.700	.70	236
77	*2-17*	*3.555*	*0.747*	***.29***	*236*
86	2-18	3.847	0.655	.70	236
89	*2-19*	*3.771*	*0.617*	***.28***	*236*
96	2-20	3.547	1.027	.63	236
104	2-21	3.585	0.751	.78	236
110	2-22	3.691	0.942	.71	236
116	*2-23*	*3.508*	*0.970*	***.32***	*236*
122	2-24	3.962	0.706	.72	236
125	*2-25*	*3.377*	*1.065*	***.19***	*236*
127	2-26	3.576	0.634	.55	236
132	2-27	3.220	0.850	.68	236
137	*2-28*	*2.814*	*0.931*	***-.00***	*236*
139	2-29	3.419	0.837	.66	236

Eight items had a total item correlation of $\leq$ 0.32 and were eliminated from the item pool, resulting in 21 remaining items which were subjected to factor analysis.

Table 5.7: Item analysis per 'project systems and structure' construct – dimension 3

Item. No.	Scale item	Item mean	Item var.	Item-scale correlation	N per Item
11	3-1	3.974	0.587	.46	236
12	3-2	2.345	0.856	.03	236
13	3-3	1.928	0.584	-.06	236
30	3-4	3.814	0.804	.29	236
31	3-5	3.708	0.936	.57	236
35	3-6	3.657	0.734	.61	236
38	3-7	3.470	1.139	.52	236
41	3-8	2.932	1.148	.31	236
43	3-9	3.127	1.162	.46	236
49	3-10	4.453	0.544	.55	236
51	3-11	4.051	0.701	.34	236
55	3-12	4.042	0.786	.32	236
58	3-13	3.648	0.897	.31	236
62	3-14	3.742	0.658	.55	236
65	3-15	3.644	0.916	.61	236
70	3-16	3.089	0.878	.49	236
73	3-17	3.381	0.685	.29	236
76	3-18	3.496	0.936	.66	236
83	3-19	4.055	0.544	.28	236
85	3-20	3.555	0.976	.62	236
88	3-21	3.102	1.193	.63	236
90	3-22	4.068	0.495	.48	236
91	3-23	3.373	0.836	.31	236
92	3-24	3.415	1.031	.37	236
93	3-25	3.754	0.889	.50	236
94	3-26	4.131	0.546	.46	236
97	3-27	3.487	0.911	.63	236
99	3-28	3.767	0.882	.34	236
101	3-29	3.936	0.848	.58	236
102	3-30	3.055	1.128	.56	236
105	3-31	4.076	0.799	.34	236
107	3-32	3.572	0.796	.63	236
109	3-33	3.068	0.978	.19	236
111	3-34	3.178	1.214	.59	236
112	3-35	3.504	1.114	.25	236
113	3-36	3.742	0.870	.47	236
114	3-37	4.021	0.589	.21	236
115	3-38	3.852	0.669	.67	236
118	3-39	3.428	0.804	.46	236
121	3-40	3.691	1.027	.63	236
124	3-41	2.941	1.183	.41	236
130	3-42	2.792	0.868	-.14	236
131	3-43	3.606	0.824	.53	236
133	3-44	4.216	0.483	.50	236
134	3-45	3.640	0.824	.59	236
138	3-46	3.767	0.814	.55	236
140	3-47	3.301	0.829	.49	236
141	3-48	3.593	1.326	.44	236

Thirteen items had a total item correlation of ≤ 0.32 and were eliminated from the item pool, resulting in 35 remaining items which were be subjected to factor analysis.

Table 5.8: Item analysis per 'project environment' construct - dimension 4

Item. No.	Scale item	Item mean	Item var.	Item-scale correlation	N per Item
9	4-1	3.373	0.971	.48	236
14	4-2	3.657	0.954	.37	236
17	4-3	3.699	0.693	.55	236
21	4-4	4.199	0.719	.35	236
22	4-5	4.157	0.624	.37	236
36	4-6	3.318	1.047	.36	236
45	4-7	3.483	0.809	.55	236
46	4-8	3.936	0.593	.65	236
50	4-9	4.055	0.639	.60	236
53	4-10	3.719	0.508	.53	236
54	4-11	3.331	1.103	.58	236
57	4-12	3.322	0.587	***.19***	236
60	4-13	3.225	1.123	***.16***	236
68	4-14	3.487	0.733	.62	236
117	4-15	3.623	0.735	.62	236
126	4-16	2.814	0.948	.40	236
128	4-17	3.470	0.953	.67	236
135	4-18	3.669	0.899	.61	236

Two items had a total item correlation of ≤ 0.32 and were eliminated from the item pool, resulting in 16 remaining items which were subjected to factor analysis.

Table 5.9: Descriptive statistics per project management culture dimension construct/scale (N=236)

Dimension scale	**1**	**2**	**3**	**4**
N of items	40	29	48	18
Mean score	140.470	103.017	170.161	61.182
Variance	433.995	200.406	390.425	57.259
Std. dev.	20.833	14.156	19.759	7.567
Skew (Sk)	-0.117	-0.309	-0.206	-0.430
Kurtosis (Ku)	-0.513	-0.321	-0.087	0.588
Cronbach Alpha	0.940	0.908	0.913	0.802

Nunnally (1978) recommends a minimum level of 0.70 for a Cronbach alpha coefficient. Therefore the overall reliability of the items per dimension was

highly acceptable, with Cronbach alpha coefficients of 0.940, 0.908, 0.913 and 0.802 respectively (see Table 5.9).

Table 5.10: Scale inter-correlations between dimensions

	1	2	3	4 (Dimensions)
1	1.000	0.863	0.902	0.800
2	0.863	1.000	0.891	0.782
3	0.902	0.891	1.000	0.825
4	0.800	0.782	0.825	1.000

The item inter-correlation (as indicated in Table 5.10) was high, which is expected of a construct that is supposed to be highly interdependent and systemic in nature.

To summarise the results from the item analysis the following items, with a total item correlation of $\leq$ 0.32 (see Tables 5.5 to 5.8) using Pearson's correlation technique were eliminated from the project management culture model within the four dimension theoretical construct:

- Project process construct

Five (5) of the initial 40 items: V7, V25, VV103, V42 and V98, leaving 35 items.

- People in projects

Eight (8) of the initial 29 items: V74, V77, V125, V137, V5, V8, V89, V116, leaving 21 items.

- Project structure and systems

Thirteen (13) of the initial 48 items: V41, V55, V58, V73, V76, V114, V109, V130, V30, V51, V83, V12, V13, leaving 35 items.

- Project environment

Two (2) of the initial 18 items: V57 and V60, leaving 16 items.

The remaining items under each project management culture dimension/construct (see Tables 5.5 to 5.8) were further subjected to Exploratory Factor Analysis (EFA) as reported in the following section on factor analysis.

5.2.2.2 Factor analysis

Exploratory factor analysis (EFA) with oblique rotation, direct oblimin, within the BMDP Statistical Software (1993) provided the results (see Tables 5.11to 5.24) obtained from the 236 responses for each of the four project management culture dimensions in the theoretical construct. A scree test was used to determine the number of factors with Kaiser's eigenvalues higher than 1.0 for each theoretical construct. The factors were chosen based on the results of the scree test, their percentage variance contribution as well as their Cronbach alpha coefficient. They were further subjected to factor analysis. The rotated analysis results were used to analyse the factor loadings. Variables with factor loadings of $\leq$ 0.5 were eliminated to improve reliability, as was described in the rationale for the methodology in Chapter 3, without compromising the theoretical framework of the holistic project management culture construct.

(a) Factor analysis on the 'project process' construct

The scree test on 'project process' revealed nine factors with an eigenvalue of > 1.0 as set out in Table 5.11.

Table 5.11: Eigenvalues and % variance for 'project process'

Factor	Eigenvalue	% Variance	Total variance
1	13.2073	30.83	0.3083
2	2.53073	5.01	0.3584
3	2.12373	3.76	0.3960
4	1.59323	3.10	0.4270
5	1.50602	2.66	0.4536
6	1.34660	2.49	0.4785
7	1.20911	2.40	0.5025
8	1.10459	2.05	0.5230
9	1.04589	1.61	0.5391
Cronbach Alpha	0.9422		

It is clear from the percentage variance representation of the factors in Table 5.11 that a one-factor or possibly a three-factor scale is evident. Hence, further factor analyses on three-factors and one-factor were done to develop the scale instrument.

The three-factor analysis (see Table 5.12) on the project process construct shows that the one-factor is more reliable with a Cronbach alpha coefficient of 0.915 and representing 29.87%. The second factor has only three items with acceptable factor loadings and is therefore not suitable for a scale, although the Cronbach alpha coefficient is higher than 0.70. This explains the preference for one-factor (see Table 5.13) with a Cronbach alpha coefficient of 0.9483 for all the variables. The eight items (see Table 5.13 in bold) with factor loadings of $\leq$ 0.50 were eliminated, resulting in 27 remaining items with a factor loading above 0.500. These 27 items were again factor-analysed (see Table 5.14). The Cronbach alpha for all the variables in Table 5.14 was 0.9301 and the total variance in data space was 34.15%. Even though some of the items in Table 5.14 had a factor loading lower than 0.500, they were not eliminated, because otherwise the theoretical construct would have been negatively affected.

Table 5.12: Sorted rotated factor loadings on 35 items in three factors in 'the project process' construct (N = 236)

Items (n =35)	Factor 1 loadings	Factor 2 loadings	Factor 3 loadings
47	**0.788**	0.00	0.00
108	**0.767**	0.00	0.00
84	**0.760**	0.00	0.00
66	**0.737**	0.00	0.00
71	**0.733**	0.00	-0.299
82	**0.723**	0.00	0.00
123	**0.695**	0.00	0.00
100	**0.667**	0.00	0.00
29	**0.665**	0.00	0.00
120	**0.626**	0.00	0.00
39	**0.555**	0.00	0.00
24	**0.535**	0.00	0.00
95	**0.513**	0.00	0.00
19	**0.509**	0.00	0.393
136	**0.500**	0.00	0.342
33	0.00	**1.000**	0.00
32	0.00	**0.885**	0.00
64	0.00	**0.517**	0.00
59	0.00	0.333	0.447
52	0.361	0.00	0.387
129	0.00	0.00	0.370
40	0.382	0.00	0.352
87	0.347	0.323	0.332
37	0.310	0.288	0.276
106	0.268	0.302	0.00
81	0.464	0.00	0.00
44	0.314	0.317	0.00
10	0.00	0.00	0.00
28	0.470	0.00	0.00
69	0.453	0.00	0.00
56	0.494	0.00	0.00
23	0.440	0.264	0.00
119	0.312	0.00	0.00
20	0.00	0.00	0.00
61	0.267	0.00	0.00
Cronbach Alpha	0.9152	0.7667	0.3612
% variance	29.87	5.66	4.07

Table 5.13: Sorted rotated factor loadings after Exploratory Factor Analysis on 35 items on one-factor for 'the project process' construct (N = 236)

Items (n =35)	**Factor 1 loadings**
19	0.717
10	0.698
120	0.694
71	0.692
108	0.687
47	0.686
100	0.677
32	0.675
95	0.674
82	0.673
39	0.662
84	0.649
28	0.642
59	0.629
37	0.622
40	0.616
20	0.615
61	0.613
69	0.588
24	0.587
123	0.577
52	0.571
106	0.570
66	0.567
81	0.558
136	0.555
64	0.553
29	***0.498***
119	***0.484***
56	***0.462***
129	***0.458***
33	***0.427***
44	***0.410***
87	***0.372***
23	***0.328***
Cronbach's Alpha	0.9483
% variance	35.35

Table 5.14: Sorted rotated factor loadings for 27 items on one factor for 'the project process' construct (N = 236)

Items (n =27)	Factor 1 Loadings
108	0.727
71	0.714
47	0.710
82	0.699
120	0.692
100	0.684
84	0.674
95	0.664
28	0.635
32	0.626
24	0.612
123	0.605
37	0.602
66	0.600
69	0.589
40	0.588
106	0.559
136	0.551
52	0.540
64	0.524
39	0.524
81	0.471
19	0.444
59	0.392
61	0.389
10	0.337
20	0.309
Cronbach's Alpha	0.9301
% Variance	34.15

(b) Factor analysis of the 'People in Projects' construct

The scree test on the 'people in projects' construct revealed eight factors with an eigenvalue of > 1.0 (see Table 5.15).

The % variance representation of the factors in Table 5.15 indicates the possibility of a one-factor or a two-factor scale, because the other six factors have a much smaller percentage than the other two. Therefore, further factor

analyses on two-factors and one-factor were done to develop the scale instrument.

The two-factor analysis (see Table 5.16) on the 'people in projects' construct shows that the one factor is more reliable with a Cronbach alpha coefficient of 0.8856 and represented 31.21%. The second factor had a Cronbach alpha coefficient of 0.6705, which is lower than the acceptable level of 0.70 and contributes only 3.46 %. This explains the preference for one factor (see Tables 5.17 and 5.18) with a final Cronbach alpha coefficient of 0.9204 for all the variables, representing 36.70%. Nine items (in bold) with factor loadings of $\leq$ 0.50 were eliminated from the first round of factor analysis on one factor (see Table 5.17), resulting in 20 remaining items, with a factor loading above 0.500.

Table 5.15: Eigenvalues and % variance for 'people in projects' construct

Factor	Eigenvalue	% Variance	Total variance
1	9.60730	19.04	0.1904
2	1.77170	14.95	0.3399
3	1.65083	3.59	0.3758
4	1.45362	2.92	0.4050
5	1.32183	2.86	0.4336
6	1.16738	2.78	0.4614
7	1.07282	2.88	0.4902
8	1.02518	2.54	0.5156
Cronbach Alpha	0.9147		

Table 5.16: Sorted rotated factor loadings on 29 items in two factors in 'the people in projects' construct (N = 236)

Items (n =35)	Factor 1 loadings	Factor 2 loadings
122	**0.800**	0.00
75	**0.797**	0.00
86	**0.768**	0.00
18	**0.738**	0.00
96	**0.667**	0.00
72	**0.657**	0.00
67	**0.616**	0.00
127	**0.609**	0.00
104	**0.574**	0.306
110	**0.547**	0.00
15	0.311	**0.568**
16	0.00	**0.559**
34	0.00	0.477
63	0.484	0.425
6	0.00	0.425
132	0.395	0.419
139	0.401	0.419
4	0.00	0.345
27	0.00	0.299
48	0.424	0.287
26	0.364	0.00
vv5	0.00	0.00
vv125	0.00	0.00
vv8	0.00	0.00
77	0.407	0.00
vv137	0.00	0.00
89	0.432	0.00
116	0.00	0.00
74	0.345	0.00
Cronbach Alpha	0.8856	0.6705
% Variance	31.21	3.46

Table 5.17: Sorted rotated factor loadings after EFA on 29 items on one factor for 'the people in project' construct (N = 236)

Items (n =29)	**Factor 1 loadings**
104	0.773
75	0.755
86	0.752
110	0.740
15	0.701
139	0.669
132	0.649
67	0.636
96	0.614
48	0.610
72	0.602
127	0.541
26	0.537
16	0.532
34	0.508
63	0.506
6	0.504
4	0.502
27	0.501
18	0.500
77	**0.366**
26	**0.346**
74	**0.222**
89	**0.216**
vv5	**0.00**
vv125	**0.00**
vv8	**0.00**
vv137	**0.00**
116	**0.00**
Cronbach Alpha	0.9103
% variance	34.60

Table 5.18: Sorted rotated factor loadings after EFA on 20 items on one factor for 'the people in project' construct (N = 236)

Items (n =20)	Factor 1 Loadings
104	0.783
75	0.735
86	0.713
110	0.712
15	0.681
139	0.666
132	0.659
67	0.639
96	0.625
48	0.610
72	0.602
127	0.541
26	0.537
16	0.532
34	0.508
63	0.501
6	0.497
4	0.453
27	0.426
18	0.397
Cronbach Alpha	0.9204
% variance	36.70

(c) Factor analysis of the 'Project systems and structures' construct

The scree test on project structure and systems revealed thirteen (13) factors with an eigenvalue of > 1.0 (see Table 5.19).

Table 5.19: Eigenvalues and % variance for 'project structure and systems' construct (N = 236)

Factor	Eigenvalue	% Variance	Total variance
1	11.6439	22.76	0.2276
2	3.16464	5.28	0.2804
3	2.38550	3.93	0.3197
4	1.96263	2.73	0.3470
5	1.75428	2.46	0.3716
6	1.62200	2.27	0.3943
7	1.45790	2.00	0.4143
8	1.34549	1.59	0.4302
9	1.30360	1.63	0.4465
10	1.24076	1.61	0.4626
1	1.18668	1.30	0.4756
12	1.09765	1.25	0.4881
13	1.06476	0.96	0.4977
Cronbach's Alpha	0.9158		

It is clear from Table 5.19 that a two-factor or three-factor scale is possible. Therefore, further factor analyses on two-factors and three-factors were done to develop the scale instrument. Table 5.20 shows the results of the three-factor scale. Although the Cronbach's alphas were higher than 0.70, one of the scales only had four items with a factor loading higher than 0.500, which did not justify a separate scale. Thus a two-factor scale was more suitable.

Five (5) items with factor loadings of $\leq$0.500 were eliminated from the two factor project systems and structure factor scale (see Table 5.21), resulting in 30 remaining items with a factor loading above 0.500. These 30 items were subjected to further factor analysis and the results are shown in Table 5.22. Each of the factors had 15 items with a Cronbach alpha above 0.70 that were included in the final assessment tool.

Table 5.20: Sorted rotated factor loadings on 35 items in three factors in the 'projects systems and structure' construct (N = 236)

Items (n =35)	Factor 1 loadings	Factor 2 loadings	Factor 3 loading
107	**0.718**	0.00	0.00
31	**0.645**	0.00	0.00
38	**0.643**	0.00	0.00
102	**0.637**	0.00	0.00
43	**0.661**	0.00	0.00
111	**0.593**	0.00	0.00
99	**0.562**	0.00	0.00
90	**0.522**	0.00	0.00
101	**0.509**	0.00	0.00
85	0.00	**0.609**	0.00
vv124	0.00	**0.556**	0.00
vv76	0.00	**0.503**	0.00
105	0.00	0.00	**0.652**
51	0.00	-0.264	**0.607**
133	0.00	0.00	**0.535**
49	0.00	0.00	**0.532**
114	0.00	0.00	**0.520**
94	0.00	0.00	**0.520**
138	0.00	0.00	**0.518**
113	0.00	0.00	**0.517**
vv92	0.00	0.00	**0.517**
65	0.00	**0.536**	0.262
35	0.00	0.390	0.00
88	0.00	0.374	0.00
70	0.00	0.368	0.00
115	0.439	0.279	0.00
11	0.00	0.414	0.00
141	0.257	0.00	0.00
97	0.423	-0.266	0.00
109	0.00	0.00	0.00
134	0.00	0.485	0.00
62	0.312	0.391	0.00
118	0.354	0.00	0.00
131	0.00	0.316	0.00
121	0.407	0.434	0.00
Cronbach alpha	0.8453	0.7892	0.7378
% Variance	23.37	5.42	4.13

Table 5.21: Sorted rotated factor loadings on 35 items in two factors in the 'projects systems and structure' construct (N = 236)

Items (n =35)	Factor 1 loadings	Factor 2 loadings
85	0.760	0.000
134	0.633	0.000
121	0.630	0.000
vv124	0.612	-0.268
65	0.586	0.000
102	0.568	0.000
62	0.555	0.000
vv92	0.544	0.000
35	0.541	0.000
90	0.538	0.000
70	0.531	0.313
11	0.518	0.000
115	0.509	0.000
113	0.506	0.000
111	0.501	0.000
vv76	0.000	0.585
141	0.000	0.577
43	0.000	0.564
99	0.000	0.553
31	0.000	0.515
51	0.304	0.507
38	0.361	0.506
101	0.000	0.503
107	0.000	0.503
49	0.000	0.502
94	0.000	0.501
109	0.293	0.501
133	0.500	0.312
138	0.500	0.286
105	0.000	0.500
97	***0.000***	***0.331***
88	***0.000***	***0.313***
118	***0.000***	***0.220***
131	***0.266***	***0.284***
140	***0.000***	***0.255***
Cronbach's Alpha	0.8417	0.7564
% Variance	23.26	5.26

Table 5.22: Sorted rotated factor loadings on 30 items in two factors in the 'project systems and structure' construct
(N = 236)

Items (n =30)	Factor 1 loadings	Factor 2 loadings
85	**0.773**	0.000
134	**0.663**	0.000
121	**0.643**	0.000
65	**0.631**	0.000
35	**0.607**	0.000
62	**0.592**	0.000
115	0.000	**0.572**
vv124	**0.567**	-0.296
70	**0.534**	0.000
11	**0.525**	0.000
90	**0.518**	0.000
43	0.000	**0.562**
99	0.000	**0.524**
31	0.279	**0.506**
38	0.251	**0.505**
51	0.000	**0.505**
107	0.254	**0.504**
101	0.360	**0.504**
109	0.000	**0.385**
vv76	0.000	**0.381**
49	0.342	**0.390**
102	0.301	**0.406**
94	0.233	**0.403**
105	0.000	**0.393**
111	**0.472**	0.000
138	**0.385**	0.000
113	**0.393**	0.000
141	0.206	**0.450**
133	**0.417**	0.000
vv92	**0.318**	0.000
Cronbach's Alpha	0.8951	0.7883
% Variance	24.37	5.68

(d) Factor analysis of the 'Project environment' construct

The scree test on the 'project environment' construct revealed five (5) factors with an eigenvalue of > 1.0 (see Table 5.23).

Table 5.23: Eigenvalues and % variance of the 'project environment' construct

Factor	Eigenvalue	% variance	Total variance
1 2 3 4 5	4.68827 1.69508 1.46004 1.22566 1.07056	10.08 12.39 14.12 5.85 3.24	0.1008 0.2247 0.3659 0.4244 0.4568
Cronbach Alpha	0.8104		

It is clear from Table 5.23 that a one-factor or two-factor scale was possible. Therefore, further factor analyses on one factor and two factors were done to develop the scale instrument.

Items with factor loading of $\leq$ 0.500 were eliminated from the project systems and structure factor scale. Thus four items (see Table 5.25 indicated in bold) were eliminated, resulting in 12 remaining items with a factor loading above 0.500.

These 12 remaining items were again subjected to factor analysis (see Table 5.26) with an acceptable Cronbach alpha of 0.8361 and a percentage variance of 30.89.

Table 5.24: : Sorted rotated factor loadings on 16 items in two factors in the 'project environment' construct (N = 236)

Items (n =16)	Factor 1 loadings	Factor 2 loadings
46	0.681	0.000
128	0.651	0.000
135	0.640	0.000
68	0.625	0.000
50	0.601	0.000
117	0.594	0.000
17	0.561	0.000
45	0.511	0.000
21	0.000	0.997
22	0.000	0.514
14	0.000	0.254
53	0.468	0.000
54	0.469	0.000
122	0.412	0.000
36	0.361	0.000
9	0.430	0.000
Cronbach alpha	0.8354	0.6208
% Variance	10.21	21.16

Table 5.25: Sorted rotated factor loadings on 16 items in one factor in the 'project environment' construct (N = 236)

Items (n =16)	Factor 1 loadings
46	0.686
128	0.641
135	0.623
50	0.622
68	0.600
117	0.595
17	0.537
54	0.512
45	0.505
122	0.505
53	0.503
9	0.501
14	***0.344***
36	***0.304***
22	***0.262***
21	***0.000***
Cronbach alpha	0.8261
% Variance	25.01

Table 5.26: Sorted rotated factor loadings on 12 items in one factor in the 'project environment' construct (N = 236)

Items (n =12)	Factor 1 loadings
46	0.693
122	0.652
135	0.637
50	0.619
128	0.618
68	0.594
117	0.590
17	0.542
54	0.511
45	0.488
53	0.477
9	0.448
Cronbach alpha	0.8361
% Variance	30.89

The final result of the factor analyses was 89 items divided into five factors that represented the project management culture assessment tool (see Table 5.27).

Table 5.27: Final factor scale for the project management culture assessment tool

Factor 1 Project process	Factor 2 People in projects	Factor 3 Project structure	Factor 4 Project systems	Factor 5 Project environment
27 items	20 items	15 items	15 items	12 items

Table 5.28 shows which items resort under which factor scale and make up the project management culture assessment tool (See Addendum B for item numbers and variable).

Table 5.28: Final items per five-factor scale after item analysis and EFA on the project management culture model and construct

Project process 1		People in projects 2	Project structure & systems		Project environment 5
			Structure 3	Systems 4	
10	40	4	11	31	9
19	52	6	35	38	17
20	69	15	62	43	45
24	82	16	65	49	46
28	95	18	70	51	50
32	100	26	85	vv76	53
37	106	27	90	94	54
39	108	34	vv92	99	68
47	120	48	111	101	117
59	123	63	113	102	122
61	136	67	121	105	128
64		72	vv124	107	135
66		75	133	109	
71		86	134	115	
81		96	138	141	
84		104			
		110			
		127			
		132			
		139			
27 items		**20 items**	**15 items**	**15 items**	**12 items**

Total number of items = 89

After the completion of the exploratory factor analyses and the elimination of items, a final item analysis was done on the 85 remaining items, out of the initial 135 items/variables, per factor root for each of the five-factor scales. The results of the final item analysis are shown in Table 5.29 to Table 5.35. All the items have a total item correlation of > 0.32, which indicates that the items in the final tool have a high validity.

Table 5.29: Final item analysis on the 'project process' factor root

Scale item	Item mean	Item Var.	Item-scale correlation	N per Item
1-1	3.466	1.020	.50	236
1-2	3.566	1.182	.66	235
1-3	3.195	1.038	.63	236
1-4	4.038	0.782	.60	236
1-5	3.856	0.810	.70	236
1-6	3.792	1.224	.39	236
1-7	3.665	0.841	.65	236
1-8	3.627	0.802	.70	236
1-9	3.458	0.723	.44	236
1-10	2.869	1.055	.56	236
1-11	3.805	0.826	.60	236
1-12	3.339	0.927	.62	236
1-13	3.203	0.840	.59	236
1-14	3.191	1.044	.41	236
1-15	3.254	1.181	.68	236
1-16	2.903	1.088	.47	236
1-17	3.889	0.566	.53	235
1-18	3.742	0.878	.69	236
1-19	4.055	0.400	.48	236
1-20	3.924	0.579	.68	236
1-21	3.508	1.123	.63	236
1-22	3.797	0.730	.59	236
1-23	2.818	1.268	.62	236
1-24	3.826	0.754	.68	236
1-25	3.890	0.734	.68	236
1-26	3.771	0.939	.69	236
1-27	3.775	0.776	.57	236

Table 5.30: Final Item analysis on the 'people' in projects factor root

Scale item	Item mean	Item var.	Item-scale correlation	N per Item
2-1	3.890	0.564	.47	236
2-2	3.525	0.953	.71	236
2-3	3.403	0.935	.65	236
2-4	3.847	0.655	.71	236
2-5	3.419	0.837	.69	236
2-6	3.250	0.984	.59	236
2-7	3.742	0.700	.71	236
2-8	3.220	0.850	.68	236
2-9	3.496	1.114	.66	236
2-10	3.492	1.013	.60	236
2-11	3.678	0.744	.54	236
2-12	3.225	0.759	.56	236
2-13	3.585	0.751	.78	236
2-14	4.229	0.490	.41	236
2-15	2.686	1.029	.51	236
2-16	3.720	0.862	.63	236
2-17	4.144	0.801	.53	236
2-18	3.547	1.027	.64	236
2-19	3.691	0.942	.73	236
2-20	3.576	0.634	.55	236

Table 5.31: Final item analysis on the 'structure' in projects factor root

Scale item	Item mean	Item var.	Item-scale correlation	N per Item
3-1	3.657	0.734	.63	236
3-2	4.216	0.483	.49	236
3-3	3.640	0.824	.65	236
3-4	3.974	0.587	.55	235
3-5	3.742	0.658	.61	236
3-6	3.644	0.916	.66	236
3-7	3.089	0.878	.58	236
3-8	3.555	0.976	.74	236
3-9	4.068	0.495	.54	236
3-10	3.691	1.027	.67	236
3-11	2.941	1.183	.56	236
3-12	3.496	0.936	.32	236
3-13	3.852	0.669	.65	236
3-14	3.178	1.214	.59	236
3-15	3.415	1.031	.45	236

Table 5.32: Final item analysis on the 'systems' in projects factor root

Scale item	Item mean	Item var.	Item-scale correlation	N per Item
4-1	3.742	0.870	.48	236
4-2	3.593	1.326	.46	236
4-3	3.470	1.139	.61	236
4-4	3.767	0.882	.53	236
4-5	3.055	1.128	.57	236
4-6	3.572	0.796	.63	236
4-7	3.068	0.978	.38	236
4-8	3.708	0.936	.64	236
4-9	3.127	1.162	.61	236
4-10	4.051	0.701	.48	236
4-11	4.076	0.799	.43	236
4-12	3.936	0.848	.63	236
4-13	4.453	0.544	.59	236
4-14	4.131	0.546	.52	236
4-15	3.767	0.814	.53	236

Table 5.33: Final item analysis on the 'environment in projects' factor root

Scale item	Item mean	Item var.	Item-scale correlation	N per Item
5-1	3.331	1.103	.57	236
5-2	3.487	0.733	.64	236
5-3	3.470	0.953	.68	236
5-4	3.699	0.693	.60	236
5-5	3.669	0.899	.68	236
5-6	3.623	0.735	.62	236
5-7	3.373	0.971	.53	236
5-8	3.936	0.593	.69	236
5-9	4.055	0.639	.65	235
5-10	3.719	0.508	.54	235
5-11	3.483	0.809	.56	236
5-12	3.962	0.706	.67	236

Table 5.34: Descriptive statistics of the final item analysis in the Five-factor scale

Scale:	1	2	3	4	5
N of Items	27	20	15	15	12
N of Examinees	236	236	236	236	236
Mean	96.191	71.364	54.140	55.517	43.775
Variance	227.052	127.011	62.476	57.835	42.793
Std. dev.	15.068	11.270	7.904	7.605	6.542
Skew	-0.144	-0.267	-0.119	-0.632	-0.346
Kurtosis	-0.471	-0.427	-0.608	0.796	0.071
Alpha	0.928	0.915	0.855	0.822	0.853

Table 5.35: Scale intercorrelations

	1	2	3	4	5
1	1.000	0.881	0.815	0.809	0.830
2	0.881	1.000	0.872	0.687	0.859
3	0.815	0.872	1.000	0.574	0.833
4	0.809	0.687	0.574	1.000	0.665
5	0.830	0.859	0.833	0.665	1.000

The descriptive statistics in Table 5.34 show that the overall reliability of the items per dimension is highly acceptable, with Cronbach alpha coefficients of 0.928, 0.915, 0.855, 0.822 and 0.853 respectively, (higher than the acceptable minimum level of 0.70). The scale intercorrelation in Table 5.35 shows that the factors are still highly intercorrelated and this can be

expected from an interdisciplinary, holistic construct of factors that are systemic in nature.

5.2.3 Testing the 'Project Management Culture Assessment Tool' (PMCAT)

The project management assessment tool derived from the research process should be able to distinguish between different sample groups to be useful as a diagnostic instrument. A hypothesis can be postulated stating that the 'PMCAT' will show a significant level of acceptance ($p \leq 0.05$) if tested in an operational project environment, thus it will indicate with a statistical significance of $p \leq 0.05$ that an organisation has or does not have a project management culture.

Two sample groups (as described in Chapter 4) completed the PMCAT. The data obtained from the two sample groups are set out in Tables 5.36 and 5.37. The biographical data shows (see Table 5.36) that the two groups differ with regard to their experience as project team members and project managers. Organisation A was expected to be more successful and to have a project management culture in place, whereas Organisation B was expected not to have a project management culture in place.

The Mann Whitney non-parametric t-test was used to confirm or reject the said hypothesis, due to independent samples and small sample size. The Levene's F- value in Table 5.37 is the assumption that the variances of the two groups are equal (Morgan & Griego, 1998). However, if the Levene's F value is statistically significant, $p \leq 0{,}05$, then the variances are significantly different and the assumption of equal variances are violated which is the case in this study. The statistical significance shown in Table 5.37 for all the factors was $p \leq 0.001$ which indicates that there is a significant difference between the two groups. Therefore the project management culture assessment tool supports the hypothesis that the tool should be able to distinguish between independent sample groups.

Table 5.36: Biographic data of the two sample groups - A and B

	Organisation A	Organisation B
Total sample N	18	25
Biographical variable		
Age (years)		
< 25	1	1
26 -30	3	2
31-35	3	10
36-40	4	8
41-45	4	1
46-50	1	1
51-55	1	2
55-60	1	0
Gender		
Male	15	16
Female	3	9
Qualifications		
Secondary School	0	0
Matric	2	5
Post School		
Certificate/Diploma	9	12
B- Degree	7	4
Honours Degree	0	3
Masters Degree	0	1
Doctoral	0	0
Industry sector		
Manufacturing	18	0
Government	0	25
Work history		
< 6 mo	0	0
6mo -2 yrs	1	1
2 -5 yrs	1	6
5-10 yrs	2	10
10-15 yrs	5	3
15-20 yrs	3	2
over 20 yrs	6	3
Marital status		
Single	1	5
Married	16	15
Divorced	1	5
Home Language		
Afrikaans	7	6
English	9	5
isiXhosa	1	6
thiVenda	0	0
isiZulu	0	4
isiNdebele	0	0
Sepedi	0	2
xiTsonga	1	0
Setswana	0	1
Seswati	0	1
Other	0	0
Years experience (mean):		
Project team member	7.8	3.8
Project manager	4.7	1.7

Table 5.37: Independent sample, Mann-Whitney t-test between two groups Organisation A and Organisation B

N(A)=18 and N(B)= 25

Variable	*Mean*		*Std. Dev.*		*F-Levene value*	*P-value*
	A	**B**	**A**	**B**		
Factor 1: Project process	102.944	73.1599	9.52	14.44	3.42	0.001
Factor 2: People in projects	75.666	50.239	8.26	9.65	2.02	0.001
Factor 3: Project structure	55.444	39.839	5.61	7.06	2.93	0.001
Factor 4: Project systems	56.888	42.879	4.81	7.57	4.21	0.001
Factor 5: Project environment	46.555	33.199	4.99	7.39	3.25	0.001

The data in Table 5.37 clearly shows that organisation A (with less respondents than organisation B) had a higher mean for all five factor scales than organisation B. Thus organisation A is perceived to be having a 'stronger' project management culture than organisation B. This also indicated that the PMCAT measures what it should measure, since organisation A was selected as the 'stronger' organisation in terms of project management application and experience. The statistical data comparing the two organisations with another and with the 100% profile of the PMCAT is best illustrated in a profile diagram (see Figure 5.1).

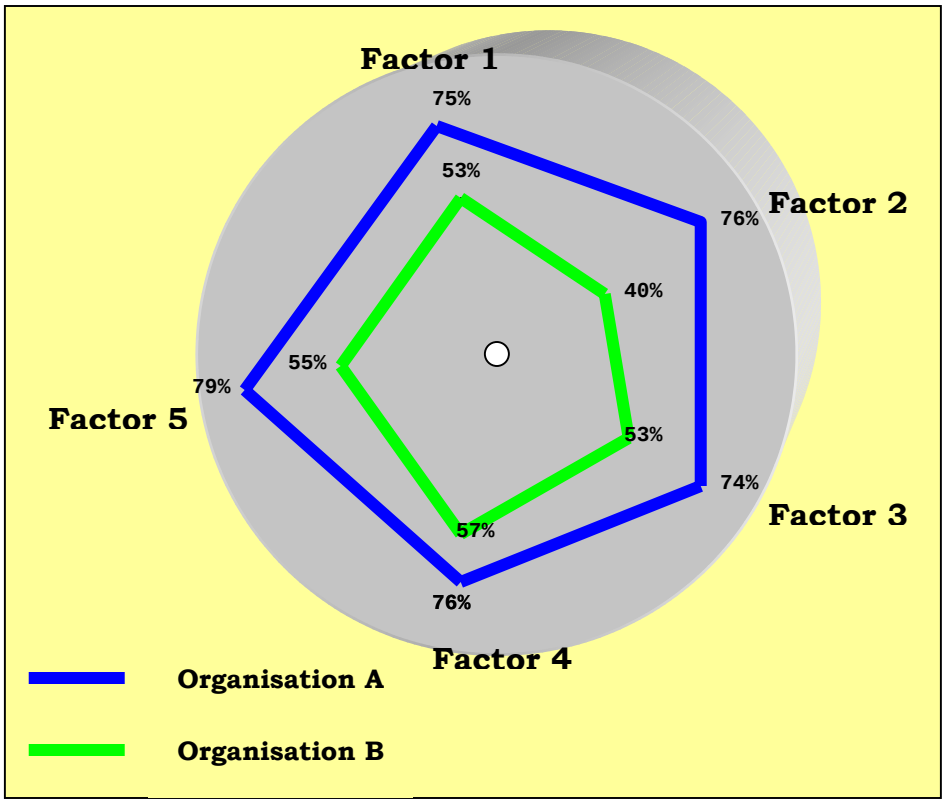

Figure 5.1: Profile of two organisations compared with the PMCAT 100% profile

5.3 CONCLUSION

It can be said that this research has achieved its primary objective, namely '*to develop a reliable holistic diagnostic assessment tool for measuring the project management culture, as operational culture, in organisations*'. As was stated in the introduction to this chapter "reliable" in this instance refers to its ability to measure what it is supposed to measure and to diagnose an organisation in terms of its project management culture. The empirical evidence in support of the primary objective of this study is shown in Table 5.1 to Table 5.37. The principles of 'good scientific research' as described in Chapter 3 and indicated in Table 3.1 ('high ethical standards applied,

adequate analysis and findings presented unambiguously') were applied during the implementation phase of this study as a project.

The rationale for the research methodology described in Chapter 3 and the research method discussed in Chapter 4 were also complied with during the empirical part of this study.

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

The important thing in science is not so much to obtain new facts as to discover new ways of thinking about them.

Sir William Bragg (1862-1942)

6.1 INTRODUCTION

Organisations that have not traditionally been involved in projects are increasingly turning to project management without fully understanding its underlying philosophy, principles and practices. This 'project management rush' by organisations of all kinds results in a situation where many organisations are faced with the dilemma of not doing as well as they had anticipated. Projects fail daily and cost organisations money. They often do not know what the causes for their losses and failures are.

One of the causes of project failure is that the organisational culture in which these projects have to deliver results is not supportive of project work (Cleland, 1988; Gray & Larson, 2000; Wang, 2001). The overall organisational environment, as an operational culture, should in fact be supportive of project principles and practices, otherwise projects cannot succeed optimally (Graham & Englund, 1997).

The literature and research conducted in this field is limited and focus mainly on sub-sections of project management culture, such as a project manager's professional culture (Wang, 2001), project team culture (Gray & Larson, 2000), or a supportive project environment (Graham & Englund, 1997).

The primary objective of this study (see Chapter 1) was: *'to develop a reliable holistic diagnostic assessment tool to measure project management culture, as an operational culture, in organisations'.* (The term 'reliable' in this instance refers to the ability of the assessment tool to differentiate between organisations.)

Sub-objectives were also formulated in support of the primary objective and to facilitate the research process. To conclude on the answers to these sub-objectives a brief summary is given in the next section.

6.2 CONCLUSION ON ANSWERS TO THE SUB-OBJECTIVES

The sub-objectives or secondary research questions (see Chapter 1) were answered in the literature study (see Chapter 2) and the rationale for methodology used (see Chapter 3). A brief conclusion on the answers to the sub-research is given.

- *Is a project management culture, as an operational organisational culture, able to contribute towards business success in organisations that use project work?*

The literature (see Chapter 2) states that organisational culture does contribute towards business success (Turner & Simister, 2000; Ashkanasy *et al.,* 2000b; Kotter & Heskett, 1992; Furnham & Gunter, 1993), and that project culture does contributes towards project success (Cleland, 1994; Lientz & Rea, 1999; Gray & Larson, 2000).

Therefore a project management culture, as operational culture in an organisation doing project work, should be able to contribute towards business success and thus project success.

- *Do businesses regard the measurement of organisational culture and project management culture as necessary or value-adding to business?*

The measurement of work-based values and corporate culture is central to business improvement and sustainability. If one cannot measure something one cannot monitor its progress as part of organisational management and business process improvement (Maullin & Townsend in http://www.cfoweb.com.au/stories). Knutson (2001) supports the measurement of project management in organisations, because it can result in prolonged utilisation of the philosophy, principles and practices of project management and therefore sustain the profession of project management.

Therefore the measurement of an organisation's project management culture could enable an organisation to identify possible stumbling blocks and focus corrective action that might lead to continuous improvement. It can also sustain the project management approach and result in the enhancement of the project management profession.

How should organisations (those currently engaged in and those that want to apply project work) assess their project management culture?

The literature reviewed (see Chapter 2) reveals a variety of often conflicting theoretical positions and a lack of empirical support for many of the measures of organisational culture. The development of an organisational culture assessment tool, which is perceived to be valid, should clearly reflect the emerging research perspectives on organisational culture and should look at the total context and not just be focused on a singular dimension.

Since project management is regarded as a holistic and interdisciplinary field, applied in an open system of multiple interdependent parts (sub-

systems) an assessment of a project management culture in organisations should view such a culture as a holistic phenomenon, inclusive of strategies, structures, systems, processes, people's behaviour and the environment.

- *What process should be used to develop a holistic organisational culture assessment tool that can be used to assess the project management culture (as an operational culture) in organisations?*

The literature reviewed (see Chapter 2) clearly stated that a thorough theoretical foundation based on the multi-disciplinary construct should be compiled and used in the development of an organisational culture assessment tool.

The model or framework on project management culture compiled by Du Plessis (2001) was used as multi-disciplinary construct based on a thorough literature review.

De Witte and van Muijen (1999) have also expressed their concern about researchers and practitioners of organisational culture's failing to address a number of crucial aspects in conducting their research. They have indicated a range of the critical questions, which should be taken into account by every researcher in organisational culture (see Chapter 3), which were done in this study.

The step-by-step scale development process (see Chapter 3) of DeVellis (1991), confirmed by Clark and Watson (1995) was followed to develop the scale instrument.

In conclusion, the sub-research questions above could be positively answered from the literature reviewed. These answers provided the

background to the empirical part of the study and thus supported the inputs to the main research question or primary objective.

6.3 VERIFICATION OF THE PROJECT MANAGEMENT CULTURE MODEL BY EXPERTS

The following research question first had to be answered before the actual development of the project management culture assessment tool could proceed.

- *What should a supportive organisational culture for optimal project success consist of ? (What are the components/ elements of a project management culture?)*

Lawshe's (1975) quantitative content validity technique was used to determine the perception of project management experts based on the model or framework on project management culture and its descriptive elements derived from previous research by Du Plessis (2001. The results derived from the content validity technique showed that sixty-three (63) out of the sixty-seven (67) descriptive elements included in the validity assessment questionnaire of a project management culture (see Table 5.2) have a content validity ratio of higher than 0.50.

This concludes that the theoretical construct of the project management culture framework and descriptive elements were perceived by experts (well qualified and experienced in the field of project management- see Chapter 5) to be valid and thus acceptable to be used in the development of a project management culture assessment tool.

6.4 CONCLUSION AND ANSWER TO THE PRIMARY OBJECTIVE PROJECT MANAGEMENT CULTURE ASSESSMENT TOOL (PMCAT)

The project management culture assessment tool (PMCAT) developed has a five-factor scale and a total of 89 items (see Chapter 5, Table 5.27). This was derived from applying the research process described in Chapter 4 and statistical techniques such as item analysis (SAS, 1997) and exploratory factor analysis (BMDP, 1993) on the initial 135 variables under the four construct theoretical model developed by Du Plessis (2001) and verified by project management experts.

The results from the empirical research (see Chapter 5) indicated that the overall reliability of the items in the final five-factor scale is highly acceptable with a Cronbach alpha coefficient of 0.928, 0.915, 0.855, 0.822 and 0.853 respectively, which are all substantially higher than the acceptable minimum level of 0.70. The scale inter-correlation (see Chapter 5, Table 3.35) showed that the factors are highly inter-correlated which can be expected from an interdisciplinary, holistic construct of factors that are systemic in nature.

The results from the empirical research on developing the scale instrument indicated that the PMCAT is an acceptable, valid and reliable tool. However this did not confirm that it could be used as a diagnostic tool which can differentiate between organisations in terms of their project management culture.

The PMCAT was tested in two independent organisations (see Chapter 4) to determine if the instrument is a reliable diagnostic tool that can distinguish between organisations.

The conclusion from testing the PMCAT in two different organisation was that it can distinguish between organisations and therefore could be successfully applied as a diagnostic instrument, since there was a statistically significant difference between the two organisations tested.

The final conclusion that can be made to answer the primary research question is that *the project management culture assessment tool (PMCAT) developed through this research*

- *is holistic in nature and measures a total project management construct by means of a five-factor scale;*
- *is reliable (statistically proven);*
- *can be used as a diagnostic tool because it can significantly distinguish between organisations; and*
- *is perceived to have a valid construct and is acceptable to project management experts in a diverse range of organisations.*

6.5 LIMITATIONS OF THE PRESENT STUDY

This study did not focus on developing an assessment tool for a specific culture (as per project) or any sub-system of the project or organisation *per se.*

Due to the study sample it cannot be generalised to say that this tool (PMCAT) will be a reliable tool in countries other than reflected in the sample population, which is mainly South African.

6.6 CONTRIBUTIONS OF THE PRESENT STUDY

This study has contributed on multiple levels to the fields of project management and organisational behaviour.

Firstly, a holistic assessment tool (PMCAT) that can measure the project management culture of organisations has been developed.

This assessment tool can measure the current project management culture (an operational culture supportive of successful projects) of organisations. It can also be used as an informative (diagnostic) tool and a development tool to identify the areas for improvement to create a project management culture for project success.

Secondly, the availability of this assessment tool would enable organisations to assess or diagnose their present organisational culture's readiness for project work. The organisations that are hoping to reap the multiple benefits from getting involved in project management, will be able to use the PMCAT to assess their present capability and thus could improve their changes to be more successful in doing project work.

Thirdly, since this tool does not focus on a particular industry or nationality, but on the organisation as a holistic operational entity, which has to perform in an open system, this tool could be used generically. Gaps in the organisational culture, with regards to improving project work, can be identified. This can facilitate actions to improve the situation, thereby optimising project work for continuous business improvement.

Finally the body of knowledge on project management and organisational culture was expanded due to the findings in this research and serve as a

valuable contribution to the theory and research base of the interdisciplinary fields of project management and organisational behaviour.

6.7 RECOMMENDATIONS FOR FUTURE RESEARCH

This study has identified the need for further studies pertaining to "project management culture" and related areas. A brief description of the possible areas for further studies are provided by formulating a hypothesis or providing a brief problem statement:

- The key project management elements in a "project management culture" differ during each phase of the project lifecycle.

- The research process used in this study can be used as a guide to develop an assessment tool for evaluating the presence of a specific type of 'culture' in a project.

- The presence of a strong project management culture (using this tool as initial measurement tool) in an organisation contributes positively to project success.

- The interdependencies between people (stakeholders) in the project environment are an integrated network of interpersonal relations and communication, which can cause project failure if it is not managed. How should these interdependencies be managed to contribute towards project success?

- The variables in a project management culture are not significantly different in different types of organisations/industries.

- The expansion of this study to a global sample will contribute significantly to a globally relevant PMCAT.

6.8 CLOSURE

'Conclusion' seems an inappropriate word to use in relation to organisational culture, for culture has followed many paths in its conceptual history as indicated in the literature study (see Chapter 2). Lewis (1996b) states it as: 'I am convinced that organisational culture's relationship with .....is simply the latest of them. It may be a highway or it may turn out to be a dead-end street. Only when there are more documented cases available will the extent of the linkage become clearer'. Hopefully, this study has contributed to the body of knowledge pertaining to the multi-disciplinary fields of project management and organisational behaviour, in more particular to project management culture as an operational organisational culture and how to assess it.

May this not be a dead end street, but a cross-road contributing to theory building and knowledge creation to feed the 'hungry mind' of the human's quest for success or continuous business improvement.

"LACTA ALEA EST" - Past the point of return. Manage the future not the present.

LIST OF REFERENCES

Adler, N. (1983). A typology of management studies involving culture, *Journal of International Business Studies,* 14, 29-47.

Argyris, C. & Schon, D.A. (1978). *Organizational Learning: A Theory of Action Perspective*, Addison-Wesley, Reading, MA.

Ashkanasy, N.K. & Holmes, S. (1995). Perceptions of organizational ideology following merger: A longitudinal study of merger accounting firms. *Accounting, Organizations and Society*, 20, 19-34.

Ashkanasy, N.K., Broadfoot, L E. & Falkus, S. (2000a). Questionnaire Measures of Organizational Culture in Ashkanasy, N.M., Wilderom, P.M. & Peterson, M.F. (Ed) *Handbook of Organisational Culture and Climate*. Sage Publications. London, *131-145.*

Ashkanasy, N.K., Wilderom, P.M. & Peterson, M.F. (Ed). (2000b). *Handbook of Organisational Culture and Climate*. Sage Publications: London.

Babbie, E. & Mouton, J. (2001). *The Practice of Social Research.* Oxford, South Africa.

Baguley, P. (1999). *Project Management.* Hodder & Stoughton: London.

Ball, A. & Asbury, S. (1989). *The Winning Way.* Jonathan Ball: Johannesburg.

Barley, S.R., Meyer, G.W. & Gash, D.C. (1988). Cultures of culture: Academics, practitioners and pragmatics of normative control. *Administrative Science Quarterly*, 37, 24-60.

Blignaut, J.N. (2001). *Class Notes*-EBW 801. University of Pretoria. South Africa.

BMDP Statistical Software, Inc. (1993). BMDP4M- Factor Analysis. Release 7.1. Los Angeles, CA.

Bohn, R.E. (1994). Measuring and managing technological knowledge. *Sloan Management Review*, Fall, 61-73.

Brown, C.J. (1999). Towards a strategy for project management implementation. *South African Journal of Business Management.* Vol. 30 *(2)*, p. 33.

Chell, E. (1994). Making the right decision, organizational culture, vision and planning. *International Small Business Journal*, Jan-March *12 (2),* p. 90.

Cheney, G. (1983). On the various and changing meanings of organizational membership: A field study of organizational identification. Communication Monographs, 50, 342-362.

Clark, L.A., Watson, D. (1995). Construct Validity: Basic Issues in Objective Scale Development. *Psychological Assessment.* Vol. 7 *(3)*, 309-319.

Clarke, A. (1999). A practical use of key success factors to improve the effectiveness of project management. *International Journal of Project Management.* June, Vol. 17 *(3)*, 139-145.

Cleland, D.I. (1982). The human side of project management. In A.J. Kelly (Ed), *New dimensions of project management.* Lexington, MA: D.C. Heath and Company.

Cleland, D.I. (1988). The Cultural Ambience of Project Management - Another Look. *Project Management Journal.* June, 49-56.

Cleland, D.I. (1994). (2nd ed). *Project Management -Strategic Design and Implementation.* McGraw-Hill.

Cleland, D.I. (1996). *Strategic Management of Teams.* Wiley & Sons, New York.

Cleland, D.I. & King, W.R. (1983). *Systems Analysis and Project Management.* New York: McGraw-Hill.

Coffey, R.E., Cook, C.W. & Hunsaker, P.L. (1994). *Management and Organizational Behavior*, Irwin, Burr Ridge, IL.

Cooke, R.A. & Lafferty, J.C. (1986). *Organizational Culture Inventory (Form 111*). Plymouth, MI: Human Synergistics.

Cooke, R.A. & Rousseau, D.M. (1988). Behavioral norms and expectations: A quantitative approach to the assessment of organizational culture. *Group and Organization Studies*, 13, 245-273.

Cooke-Davies, T. (2002). The "real" success factors on projects. *International Journal of Project Management* April, Vol. 20 *(3)* 185-190.

Coopers, D.R & Schindler, P.S. (2001). (7th ed). *Business research methods.* Boston: McGraw-Hill International.

De Wit, A. (1988). Measurement of project success. *International Journal of Project Management*, Vol. 6**.**

De Witte, K. & van Muijen, J.J. (1999). Organisisational Culture: Critical Questions for Researches and Practitioners. European *Journal of Work and Organisational Psychology*, 8 *(4)*, 583-595.

Deal, T.E. & Kennedy, A.A. (1982). *Corporate cultures: The rites and rituals of corporate life.* Addison-Wesley: Reading MA.

Deane, R.H. & Clark, T.B. (1997). Creating a learning project environment. *Information Systems Management*, Summer, Vol. 14 *(3)* 54-61.

Denzin, N.K, & Lincoln, Y.S. (2000). *Handbook of Qualitative Research*, Sage Publications, Thousand Oaks, CA, 105-17.

Deshpande, R. (1983). Paradigms lost: on theory and method in research in marketing, *Journal of Marketing*, 47, 101-10.

DeVellis, R.F. (1991). Scale Development: Theory and Application. *Applied Social Research Method Series.* Vol.26. Sage Publications: London.

Dinsmore, P.C. (1999). *Winning in Business with Enterprise Project Management*. Amacom Publishers.

Du Plessis, Y. (2001). *Defining the concept of "Project culture" in organisations – A framework of guiding principles.* Unpublished MBA Dissertation, University of Pretoria, Pretoria.

Duncan, O.D. (1984). Notes on social measurement. Historical and critical. New York: Russel Sage.

Duncan, W.R. (2001). Message posted on the electronic discussion forum of PMNET at Feb. 12, 2001 (Website: http://lists.uts.edu.au/mailman/listinfo/PMNET).

Everard, R. & Louis, M. (1981). Alternative perspectives in organizational science: inquiry from the inside and inquiry from the outside. *Academy of Management Review*, No. 6, 385-395.

Faules, D. (1982). The use of multimethods in the organizational setting. *Western Journal of Speech Communication*, 42, 150-161.

Fiol, C.M. & Lyles, M.A. (1985). Organizational learning. *Academy of Management Review*, 10 *(4)*, 803-813.

Firth, G. & Krut, R. (1991). Introducing a project management culture. *European Management Journal*, 9 *(4)*, 437-443.

French, W.L. & Bell, C.H. (1995). *Organizational Development: Behavioral Science Interventions for Organization Improvement*, (5th ed), Prentice-Hall International, Englewood Cliffs, NJ.

Frost, P.J., Moore, L.F., Louis, M.R., Lundberg, C.C. & Martin, J. (Eds). (1991). *Reframing organizational culture*. Newbury Park, CA: Sage.

Furnham, A. & Gunter, B. (1993), *Corporate Assessment: Auditing a Company's Personality*, Routledge, London.

Galbraith, J.R & Lawler, E.E. (1998) in Mohrman, S A, Galbraith J R., Lawler 111 E.E. and Associates. *Tomorrow's Organisation-Crafting Winning Capabilities in a Dynamic World***.** Jossey-Bass : San Francisco, California. 1-20.

Garson, (2002): *Factor analysis*
http://www2.chass.ncsu.edu/garson/pa765/factor.htm

Glaser, S.R., Zamanou, S. & Hacker, K. (1987). Measuring and interpreting organizational culture. *Management Communication Quarterly*, 1 *(2)*, 173-198.

Gordon, G.G. (1991). Industry determinants of organizational culture. *The Academy of Management Review,* (USA), April. 16 *(2),* 396-416.

Gordon, G.G., & Ditomaso, N. (1992). 'Predicting corporate performance from organizational culture'. *Journal of Management Studies,* 29, 783-798.

Gorsuch, R.L. (1983). (2nd ed). *Factor Analysis***.** Hills-dale, NJ: Lawrence Erlbaum.

Graham, R.J. & Englund, R.L. (1997). *Creating an Environment for Successful Projects*. Jossey-Bass Publishers : San Francisco, California.

Graham, R.J. (1993). A process of organizational change from bureaucracy to project management culture. In P.C. Dinsmore (ed), *The AMA Handbook of Project Management*. New York: AMACOM, a division of American Management Association.

Gray, C.F. & Larson, E.W. (2000). *Project Management – The managerial process*. Irwin McGraw-Hill: USA.

Grundy, L.K. & Rousseau, D.M. (1994). Critical incidents in communicating culture to newcomers: The meaning is in the message. *Human Relations*, 47, 1063-1088.

Grundy, T. & Brown, L. (2002). *Strategic Project Management*. Thomson Learning: London.

Gummesson, E. (1999). *Qualitative Methods in Management Research.* Sage Publications: London.

Guy, L.R. & Diehl, P.L. (1992). *Research methods for business and management*. New York: Macmillan.

Hair, J.F., Anderson, R.E., Tatham, R.L. & Black, W.C. (1998). Multivariate Data Analysis. (5th ed). Prentice-Hall International, Inc.

Hall, J. (1999). Six principles for successful business change management. *Management Services Enfield*. April Vol. 43 *(4)*, 16-18.

Harris & Moran. (1984) in Ashkanasy, N.M., Wilderom, P.M. & Peterson, M.F. (Ed). (2000). *Handbook of Organisational Culture and Climate*. Sage Publications: London.

Harrison, F.L. (1992). *Advanced Project Management* (3rd ed). New York: Halsted Press.

Hobbs, B. & Menard, P. (1993). *Organizational choices for project management*. In P.C. Dinsmore (Ed), The AMA Handbook of project management. New York: AMACON, 81-113.

Hofstede, G. & Neuijen, B. (1990). Measuring organizational cultures: A qualitative and quantitative study across twenty cases. *Administrative Science Quarterly*, Jun, Vol. 35 *(2)* 286-316.

Hofstede, G. (1998). Identifying organizational subcultures: an empirical approach. *Journal of Management Studies*, 35 *(1)*, 1-12.

Jiang, J.J., Klein, G. & Discenza, R. (2002). Pre-project partnering impact on an information system project, project team and project manager. *European Journal of Information Systems.* Vol. 11 *(2),* 86-97.

Jick, T.D. (1979). Mixing qualitative and quantitative methods: Triangulation in action, *Administrative Science Quarterly*, 24, 602-611.

Johns, T.G. (1999). On creating organizational support for the Project Management Method. *International Journal of Project Management.* Vol. 17 *(1)*, February, 47-53.

Kerlinger, F.N. (1986). (3rd ed). *Foundations of behavioural research*. Holt, Rinehart and Winston: NY.

Kerzner H. (1997). (6th ed). *Project management: A Systems Approach to Planning, Scheduling and Controlling.* Van Norstrand Reinhold, New York.

Kerzner, H. (2000). *Applied Project Management*. New York: John Wiley & Sons.

Knutson, J. (2001). *Succeeding in Project-Driven Organizations-People, Processes, and Politics.* John Wiley & Sons: New York.

Kotnour, T. (1999). A Learning Framework for Project Management. *Project Management Journal*, Jun, Vol. 30 *(2)*, 32-39.

Kotter, J.P. & J.L. Heskett. (1992). Corporate Culture and Performance. New York Free Press.

Kreps, G. (1989). A therapeutic model of organizational communication intervention: Application of interpretive field methods. *Southern Communication Journal*, 55, 1-21.

Kroeber, A.L. & Kluckholn, C. (1952). *Culture: A Critical Review of Concepts and Definitions*, Harvard University Press, Cambridge, MA.

Lahey, L. (2002). Companies lack project management fundamentals. *Computing Canada*, Vol. 28 *(19)*, 1-2.

Lawshe, C.H. (1975). A quantitative approach to content validity. *Personnel Psychology*, 28, 563-575.

Leedy, P.D. (1993). *Practical Research.* Prentice Hall: London.

Lewis, D. (1996a). The Organisational Culture Saga - from OD to TQM: a critical review of the literature. Part 1- concepts and early trends. *Leadership & Organisation Development Journal.* 17 *(1)* 12-19.

Lewis, D. (1996b). The Organisational Culture Saga- from OD to TQM: a critical review of the literature. Part 2- Application. *Leadership & Organisation Development Journal.* 17 *(2)* 9-16.

Lientz, B.P. & Rea, K.P. (1999). *Breakthrough Technology Project Management.* Academic Press.

Likert, R. (1967). *The human organization.* McGraw-Hill: New York.

Locatelli, V. & West, M.A. (1996). On elephants and blind researchers: methods for accessing culture in organizations. *Leadership & Organisation Development Journal.* 17 *(7),* 12-21.

Loo, R. (2002). Working towards best practices in project management a Canadian study. *International Journal of Project Management.* Vol. 20 (2), February, 93-98.

Lundberg, C.C. (1990), Surfacing organizational culture, Journal of Managerial Psychology,Vol 5(4), 19-36.

Marcoulides, G.A. & Heck, R.H. (1993). Organisational culture and performance: Proposing and testing a model. *Organisation Science*, 4, 209-225.

Martin, P.K. & Tate, K. (1998). Projects that get quality treatment. *The Journal for Quality and Participation.* Nov/Dec Vol. 21 *(6)* 58-61.

Martins, E.C. & Terblanche, F. (2003). Building organisational culture that stimulates creativity and innovation. *European Journal of Innovation Management.* 6 *(1),* 64-74.

Martins, E.C. (2000). Die invloed van organisasiekultuur op kreatiwiteit en innovasie in 'n universiteitbiblioteek/The influence of organisational culture on creativity and innovation in a university library', Minf dissertation, University of South Africa, Pretoria.

Maullin, D. & Townsend, S. The value of culture. *CFO magazine, http://www.cfoweb.com.au/stories*

McShane, S.L. & von Glinow, M.A. (2003). *Organisational Behaviour-Emerging realities for the workplace revolution*. International edition.

Mead, S.P. (2001). Using social network analysis to visualize project teams. *Project Management Journal*, 32 *(4)*, 32-38.

Meek, V.L. (1988). Organisational culture: Origins and weaknesses. *Organisation Studies*, 9, 453-473.

Morgan, G.A. & Griego, O.V. (1998). *Easy use and interpretation of SPSS for Windows*. Lawrence Erlbaum Ass.: New Jersey.

Mouton, J. (1996). *Understanding social research.* Pretoria: Van Schaiks, 35-4, 107-113, 125-131.

Mouton, J. & Marais, H.C. (1988). *Basic concepts in the methodology of the social sciences*. Pretoria: HSRC.

Neuman, W.L. (2000). (4th ed). *Social Research Methods-Qualitative and Quantitative Approaches*. Allyn and Bacon. Boston.

Nicholas, J.M. (1997). *Managing Business and Engineering Projects. Concepts and Implementation*. Prentice-Hall. Englewood Cliffs. Open University Press.

Nunnally, J. (1978). *Psychometric Theory.* New York: McGraw-Hill.

O' Reilly, C.A. 111, Chatman, J.A. & Caldwell, D.F. (1991). People and organizational culture: A profile comparison approach to assessing person-organization fit. *Academy of Management Journal*, 34, 487-516.

Ott, J.S. (1989). *The Organisational Culture Perspective.* Brooks/Cole, Pacific Grove, CA.

Peters, L.A. & Homer, J. (1996). Learning to lead, to create quality, to influence change in projects. *Project Management Journal,* 27 *(1)*, 5-11.

Peters, T.J. & Waterman, R.H. Jr. (1982). *In search of excellence: lessons from America's best-run companies.* Harper & Row: New York.

Pinto, J.K. & Kharbanda, O.P. (1996). How to fail in project management without really trying. *Business horizons*, Jul/Aug, 39 *(4),* 45-55.

Pinto, J.K. (1998). *The Project Management Institute - Project Management Handbook*. Jossey-Bass: San Francisco, California.

Pinto, J.K. (2002). Project management 2002. *Research Technology Management.* Mar/Apr, Vol. 45 *(2)*, 22-37.

Reichers, A.E. & Schneider, B. (1990). Climate and culture: An evolution of constructs. In B. Schneider (Ed), *Organisational Climate and culture,* 5-39. San Francisco: Jossey-Bass.

Rentsch, J.R. (1990). Climate and culture: Interaction and qualitative differences in organizational meanings. *Journal of Applied Psychology*, 75, 668-681.

Reynierse, J.H. & Harker, J.B. (1986). Measuring and managing organizational culture. *Human Resource Planning*, 9, 1-8.

Reynolds, P.D. (1986). Organizational culture as related to industry, position and performance. *Journal of Management Studies*, 23, 333-345.

Rodrick, R. (1988). The emergent paradigm and organizational communication research. *Paper presented at the meeting of the Western Speech Communication Association Convention*, San Diego, CA.

Rousseau, D.M. (1990). *Assessing organizational culture: The case of multiple methods.* In B. Schneider (Ed.), Organizational climate and culture, 153-192. Jossey-Bass: San Francisco.

Saffold, G.S. (1988). Culture traits, strength, and organizational performance: Moving beyond 'strong' culture. *Academy of Management Review*, 13, 546-558.

Saia, R. (1997). Harvesting project leaders. (cultivating project managers) *Computer world*, July 21, V 31 n29, 81(1).

SAS Institute, Inc. (1999). SAS 8.2, Version 8. Cary, NC.

Sashkin & Fulmer. (1989) in Ashkanasy, N.M., Wilderom, P.M. & Peterson, M.F. (Ed). (2000). *Handbook of Organisational Culture and Climate*. Sage Publications: London.

Schein, E.H. (1985). *Organisational culture and leadership.* Jossey Bass: San Francisco.

Schein, E.H. (1990). Organisational culture. *American Psychologist*, 45, 109-119.

Shenhar, A.J., Tishler, A., Dvir, D., Lipovetsky, S. & Lechler, T. (2002). Refining the search for project success factors: a multivariate, typological approach. *R & D Management*. Vol. 32 *(2)*, 111-126.

Silvester, J., Anderson, N.R. & Patterson, F. (1999). Organizational culture change: an inter-group attributional analysis. *Journal of Occupational and Organizational Psychology,* March 72/1, 1(2).

Smircich, L. (1983). Concepts of Culture and Organisational Analysis. *Administration Science Quarterly,* 28, 339-358.

Smith, A.J. (1999). *Project Management Class notes*, MBA, University of Pretoria.

Sweeney, P.J. & Lee, D.R. (1999). Support and commitment factors of project teams. *Engineering Management Journal*. 11/3, 13-18.

Trice, H.M. & Beyer, J.M. (1984). Studying organisational culture through rites and rituals. *Academy of Management Review*, 9, 653-669.

Tucker, R.W., McCoy, W.J. & Evans, L.C. (1990). Can questionnaires objectively assess organizational culture?. *Journal of Managerial Psychology*, Vol. 5, 4-11.

Turner, J.R. (1993). *Handbook of Project-based Management: Improving the process for achieving Strategic Objectives*. McGraw-Hill, London.

Turner, J.R., Simister, S.J. (2000). (3rd ed). *Gower Handbook of Project Management*. Gower Publishing: Aldershot.

Von Bertalanffy, L. (1950). The theory of open systems in physics and biology, *Scienc*e, Vol. 111, 23-9.

Wang, X. (2001). Dimensions and current status of project management culture. *Project Management Journal,* 32 *(4)*, 4-17.

Webster's Revised Unabridged Dictionary, © 1996, (1998). MICRA, Inc.

Weick, K.E. (1985). The significance of corporate culture. In P.J. Frost, L.F., Moore, M.R., Louis, C.C. Lundberg & J. Martin (Eds), *Organizational culture*, 381-389). Beverly Hills, CA: Sage.

Wells, W.D. (1993). Discovery-oriented consumer research**,** *Journal of Consumer Research*, 19, 489-503.

Weirauch, N.K. (1996). Integrating Quantitative and Qualitative Methods in Social Marketing Research. *Social Marketing Quarterly.*

Wiener, Y. (1982). Commitment in organizations: a normative view. *Academy of Management Review*, 7, 418-428.

Wilkins, A.L. (1984). The creation of company cultures: The role of stories and human resource systems. *Human Resource Management*, 23, 41-60.

Wilkins, A L. & Ouchi, W.G. (1983). Efficient cultures: Exploring the relationship between culture and organizational performance. *Administrative Science Quarterly*, 28, 468-481.

Woodcock. (1989) in Ashkanasy, N.M., Wilderom, P.M. & Peterson, M.F. (Ed). (2000). *Handbook of Organisational Culture and Climate*. Sage Publications: London.

Xenikou, A. & Furnham, A. (1996). A correlation and factor analytic study of four questionnaire measures of organizational culture. *Human Relations*, 49, 349-371.

Zamanou, S. & Glaser, S.R. (1994). Moving toward participation and involvement: managing and measuring organizational culture. *Group & Organization Management*. Dec. 19/4, 475(28).

Zimmer, B.T. (1999). Project management: Break through or bust. *Hospital Material Management Quarterly*, Aug Vol. 21 *(1)*, 93-99.

Zwell, M. (2000). *Creating a Culture of Competence*. John Wiley & Sons, New York.

Addendum A

Relevance Assessment Questionnaire
Project Management Culture Dimensions and Elements

Dear Participant

You have been selected to participate in this assessment due to your experience and expertise in project management. Please complete the attached questionnaire. Your valuable contribution to this study, which is part of a Ph.D in Organisational Behaviour in the Department of Human resources Management at the University of Pretoria, is highly appreciated.

In a previous study, on project management culture, conducted by Y du Plessis (2001), project management culture was defined as: '**The way** (*project process*) **we** (*people in project*) **do things** (*project systems and structure*) **around here** (*internal and external project environment*)'. Various elements were also identified as being important in describing a project management culture under the **dimensions** reflected in the above definition:

A. Project process
B. People in project
C. Project structure and systems (methodology)
D. Project environment

This assessment attempts to determine the relevance of the dimensions and associated descriptive elements as perceived by project management experts, as well as to identify additional elements that are perceived to be relevant.

Please complete the questionnaire and send it **back by 11 February 2002**.

Thank you for your time and effort.

Yvonne du Plessis
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Tel: 27 833056227

Addendum A:

Relevance questionnaire on project management culture dimensions and associated descriptive elements

Please complete the following questionnaire. There are no right or wrong answers. Judge **each item** honestly, as you perceive it, based on your own experience. Indicate with an X in the relevant block *'not essential' or 'essential'* to project management success.

DIMENSIONS and descriptive elements of a project management culture		
What is the relevance of the following dimensions and elements with regard to contributing towards a project management culture that leads to project success:	**Not essential**	**Essential**
A. Process (the manner in which the project is designed, planned, and executed and controlled/monitored).		
B. People (project stakeholders)		
C. Structure and systems (project methodology)		
D. Environment (internal and external)		
A. The Project process		
1. The project process should be focussed on **results and delivering** unique outcomes		
2. The project process must be **clearly visualised and described**.		
3. **Discipline** regarding time, cost and quality is necessary.		
4. **Control** should be 'tight' to ensure cost deliverables		
5. **Control** should be 'loose' to ensure flexibility and innovation		
6. **Control** is necessary to monitor progress and take necessary action		
7. **Learning and continuous improvement** should be part of projects		
8. Understanding and satisfying **customer needs** are necessary		
9. **Successes** should be determined and built into the **learning process**		
10. **Failures** should be determined and built into the **learning process**		
11. **Communication** should be continuous		
12. Planned **communication sessions** should be conducted to give and obtain feedback		
13. Understanding and applying the **project life cycle** will contribute towards success		
14. The 'w**ork breakdown structure'** should be used to **select** people for the project team.		

B. People in projects		
	Not essential	**Essential**
1. Project success relies on sound **interpersonal relationships**		
2. Stakeholder **commitment** is necessary throughout the project life cycle		
3. People in projects should understand the **interdependence** between them		
4. Everyone involved in the project should be **disciplined** to deliver according to plan		
5. Projects have a **risk propensity** and need people who can take risks without being careless		
6. Every member in the project life cycle should have **clear goals and responsibilities**		
7. **Power and authority** have to be managed		
8. Tolerance for **conflict** is necessary		
9. **Interpersonal conflict** should be managed before it becomes destructive		
10. An affinity to **learning** is necessary during projects		
11. Everyone involved in the project must be **results' oriented**		
12. There must be **open communication** at all times		
13. People must be able to **respond quickly** to project demands		
14. Everyone in the project must understand their **role and responsibility**		
15. Teamwork is important		
16. **Trust** amongst project stakeholders is important		
17. Managing **stress** is necessary		
18. Team member **credibility** is important		
19. People in projects must **understand** the **importance of the project** and how they affect it		
20. The project manager should have **credibility** amongst stakeholders		
21. **Project leadership** should be focused on creating a competent team to realise project goals		
22. Keeping **focus on the project goal** is vital		
23. People working on projects must be **technically competent**		
24. People working on projects must have sound **interpersonal skills**		
25. Competent people should be recruited for the project		
26. Team members are carefully **selected** for each project		

C. Project structure and systems		
	Not essential	**Essential**
1. **Teamwork** is an essential structure for project success		
2. The utilisation of the **organisational structure** should support project work		
3. Team members should be allowed to participate in the development of the project plan		
4. Middle- management involvement in the initial stages of the project should be ensured		
5. **Interdependence** amongst project stakeholders is important		
6. Project activities should be i**ntegrated** with the strategic priorities of the organisation		
7. The project goal should be fully **integrated** with the strategic objectives of the organisation		
8. **Networking structures** play a vital role in project success		
9. **Flexibility** is necessary with regard to structure to ensure optimisation of resources		
10. Delivery of unique project outcomes needs a sound **customer orientation**		
11. The project's future lies in developing **clear goals**		
12. Understanding and utilising **project methodology** and tools are important		
13. The project plan has to be developed with clear milestones		
14. The utilisation of **project management techniques is** essential		
15. **Specifications** have to be developed for each project		
D. Project environment		
1. Management provides **sufficient resources** for the project		
2. Organisational **practices and systems** should enable the project to deliver according to plan		
3. **Top management support** for the project is essential		
4. **Politics and power** should be sorted out or managed before the project commences		
5. Projects **create change** and thus create uncertainty which has to be managed		
6. The customer and external stakeholders' expectations **should be understood**		
7. **Rewards and recognition** should be agreed when goals are set and aligned with organisation policy		
8. **Rewards and recognition** should foster positive performance and motivation		
9. **External changes** should be frequently monitored		
10. Projects implemented in the same **environment influence** each other		
11. The project environment encourages **innovation and creativity**		

Biographical information. Please complete this table by marking the block that represents you with an X.

Type of industry	1. Service (e.g. Banking, Education, Government)			
	2. Technical (e.g. Engineering/Manufacturing)			
Type of projects	a. Technical ('hard-side' e.g. production, manufacturing)			
	b. Non-Technical ('soft-side' e.g. processes, service delivery)			
Years of project work experience	5-10 yrs	11-15 yrs	16-20 yrs	21 +yrs
Highest Qualification	Bachelor's degree	Honour's degree	Master's degree	Doctoral degree

Any comments:

_____

_____

_____

_____

Thank you for completing this questionnaire.

Please e-mail to: ydupless@hakuna.up.ac.za
or
Send to: Yvonne du Plessis, Department of Human Resources Management, Room 3-80, Economics and Management Sciences Building, University of Pretoria, Pretoria, 0001

PROJECT MANAGEMENT CULTURE QUESTIONNAIRE

Please complete the following questionnaire. This questionnaire contains statements relating to the characteristics of a 'Project Management Culture', i.e. 'the way things are done in project environments' to facilitate project success. **Each item must be rated** on a five-point scale whether you agree with the statement or not. Use the following rating guidelines.

1 = strongly disagree
2 = disagree
3 = neither disagree or agree
4 = agree
5 = strongly agree

There are no right or wrong answers. Respond to each statement in an honest manner, based on **your personal experience in and perception of successful projects in general**.

	For office use only		
1	**Respondent number**		**1-3**
2	**Card number**	**0 1**	**4-5**
3	**Repeat number**		**6**
	Please rate each of the following statements as per rating scale:	**Rate**	
4	There is a good relationship amongst the team members		**7**
5	Risk is something to be avoided at all costs		**8**
6	Conflict within teams are recognised and dealt with		**9**
7	Project procedures must be followed conscientiously		**10**
8	Conflict always influences the success of the project negatively		**11**
9	External project environmental changes are frequently monitored		**12**
10	Decisions are made quickly		**13**
11	Team members are allowed to take initiative in problem solving		**14**
12	Project success is more important than resolving personal differences		**15**
13	The main focus of the project is on results		**16**
14	Changes in one project / department effect other projects or departments		**17**
15	There is a strong sense of belonging between the project team members		**18**
16	There is a high degree of trust between senior management and team members		**19**
17	There is a positive relationship between the project manager and senior management		**20**
18	The project manager's leadership ability helps to achieve the project results		**21**
19	The project process is clearly visualised during the design phase		**22**
20	Rewards and recognition are used to increase motivation in projects		**23**
21	Uncertainty is part of everyday life in projects		**24**
22	Change is a way of life in projects		**25**

23	The project process is clearly visualised		**26**
24	Each team member is disciplined to deliver according to plan		**27**
25	Rewards and recognition foster performance		**28**
26	Risk is monitored on a continuous basis		**29**
27	Politics and power should be managed before project implementation		**30**
28	Customer expectations are clearly defined		**31**
29	Progress assessment is done on a regular basis		**32**
30	Quality standards are maintained		**33**
31	The project is clearly structured by means of work breakdown structures, definite start and finishing dates, (budget, resource allocation, etc.)		**34**
32	Deadlines are mostly met		**35**
33	The project process meets time deadlines		**36**
34	There is a high tolerance for conflict		**37**
35	Interdependence amongst stakeholders is recognised		**38**
36	Organisational practices and systems enable the project to deliver as planned.		**39**
37	External stakeholders' expectations are clearly defined		**40**
38	Individual performance is evaluated according to the project goals		**41**
39	The project process is focused on delivering project outcomes		**42**
40	Project mistakes are openly discussed		**43**
41	The team maintains a personal relationship with the customer		**44**
42	Short and informal lines of communication are followed		**45**
43	The work break down structure is used as a selection criteria for the selection of team members		**46**
44	Uncertainty is minimised by disseminating information to relevant stakeholders		**47**
45	The project team has a good relationship with the various suppliers		**48**
46	The project team is viewed as credible		**49**
47	The project process is clearly described		**50**
48	Calculated risk taking is encouraged		**51**
49	Team work is important for project success		**52**
50	The project manager has a good relationship with the customer		**53**
51	Utilising project methodology and tools are important for project success		**54**
52	Uncertainty is dealt with through open communication		**55**
53	The project manager has a good relationship with the various suppliers		**56**
54	Management provides sufficient resources for the project		**57**
55	The status of the organisation depends on the results and success of its projects		**58**
56	The project process supports deliverables		**59**
57	There is a positive relationship between the project manager and senior		**60**

	management		
58	Teams are responsible for their own work schedules		**61**
59	Meetings and red tape procedures are kept to a minimum in the project life cycle		**62**
60	Changes external to the project environment must first be discussed by senior management before decisions are made		**63**
61	Team activities take place in an organised fashion		**64**
62	Teams have structural flexibility to perform their tasks		**65**
63	Business is conducted in an ethical manner		**66**
64	Budgets are not exceeded		**67**
65	Work activities are organised around the team		**68**
66	Projects form part of the organisations strategy.		**69**
67	Team members look out for each other's interest		**70**
68	Rapport is maintained between senior management and project teams		**71**
69	Past project experiences and mistakes are well documented		**72**
70	Project teams are capable of responding immediately to changes in the external environment		**73**
71	There is a clear project plan		**74**
72	The project manager's style is adaptive to the different project phases		**75**
73	Project work has a high risk propensity		**76**
74	Temporary relationships and situations are normal		**77**
75	The team has faith in the project manager		**78**
76	Teams are penalized for failures and mistakes		**79**
77	There is a high degree of trust amongst the team members		**80**
	For office use only		
78	**Respondent number**		**1-3**
79	**Card number**	**0** **2**	**4-5**
80	**Repeat number**		**6**
	Please rate the following statements as per rating scale:	**Rate**	
81	The project process is focused on results		**7**
82	Each team member has a clear understanding of his/her role		**8**
83	Different individuals are responsible for different work activities		**9**
84	The progress of the project is carefully and systematically monitored		**10**
85	The team has the authority to make decisions		**11**
86	The project manager gets on well with the project members.		**12**

87	All relevant stakeholders are committed throughout the project life-cycle		**13**
88	The risk profile for each project is determined along the project life cycle		**14**
89	The project manager and the team get on well		**15**
90	The team is responsible for solutions of problems		**16**
91	Management follows a decentralised approach in decision-making.		**17**
92	It does not matter what means are used to achieve project results, as long as the results are achieved		**18**
93	Specifications are developed for each project		**19**
94	Business facts and objectives should drive the project rather than emotions		**20**
95	Team members are committed to the success of the project		**21**
96	The project manager is well trained in project management theory and practice		**22**
97	The team participates in formulating the project plan and strategy		**23**
98	Team members have an open line of communication to stakeholders regarding problems, successes and failures of the project		**24**
99	The results of the project influence individual performance appraisal		**25**
100	There are regular communication sessions		**26**
101	The project plan consists of clear milestones		**27**
102	Rewards are allocated on the basis of team results		**28**
103	Authorisation is a slow administrative process		**29**
104	Interpersonal conflict and differences are managed in a constructive way for mutual benefit		**30**
105	Understanding project methodology and tools are important for project success		**31**
106	All relevant stakeholders are disciplined to deliver according to plan		**32**
107	The team's performance is evaluated according to the project goals		**33**
108	There are clearly defined control measures		**34**
109	Rewards are based on individual performances		**35**
110	Team members are encouraged to learn from past mistakes.		**36**
111	Team members are carefully selected for each project		**37**
112	Corrective actions are taken pro-actively		**38**
113	Networking structures play a vital role in project success		**39**
114	The project performance is influenced by individual performance		**40**
115	Each team member knows exactly what he/she is responsible for		**41**
116	Teams use resources from a common pool		**42**
117	Management is enthusiastic about the projects		**43**
118	Team members are encouraged to be aggressive in achieving success		**44**
119	Communication is prompt and accurate		**45**
120	Feedback on project progress is provided on a regular basis		**46**

121	The organization's structure supports project teams		**47**
122	The project manager is viewed as credible		**48**
123	The project follows the phases according to the project life cycle		**49**
124	Management interferes with decision making procedures		**50**
125	Senior management supervises team activities		**51**
126	The organization protects its team against external influences		**52**
127	Project team leadership is focused on a competent team		**53**
128	Management provides sufficient support for the projects		**54**
129	Information with regard to the project is freely available		**55**
130	Units within the organization are encouraged to operate in an independent manner		**56**
131	Team results supersedes individual results		**57**
132	There is a high degree of trust amongst the various stakeholders		**58**
133	The project performance is influenced by the team performance		**59**
134	Teams receive support from other teams when necessary		**60**
135	The project environment encourages innovation and creativity		**61**
136	Team members have direct access to project information		**62**
137	The project manager closely supervises each team member		**63**
138	Organisational goals supercedes personal agendas		**64**
139	Team members have the courage to view their criticism openly		**65**
140	Stakeholders are prepared to take calculated risk		**66**
141	Feasibility studies are done before every project		**67**

Biographical information

Please provide the following information about yourself by marking the relevant number

For office use only

142. Age — **14[illegible]** — **68-69**

25 years or less	*1*	26 - 30 years	*2*	31 - 35 years	*3*	36-40 years	*4*
41 - 45 years	*5*	46-50 years	*6*	51-55 years	*7*	Over 55 years	*8*

143.Gender Male 1 Female 2 — **143** — **70**

144. The economic sector in which you are working: — **144** — **71-72**

(Mark one sector only)

Primary Sector	
Agriculture, forestry and fishing	01

	Mining and quarrying		02	
	Secondary sector			
	Manufacturing		03	
	Electricity, gas and water		04	
	Construction (contractors)		05	
	Tertiary sector			
	Wholesale and retail trade, catering and accommodation		06	
	Transport, storage and communication		07	
	Financial intermediation, insurance, real estate and business services		08	
	Community, social and personal services		09	
	General government services		10	
	Others (please name)		11	
	Other producers (please name)		12	

145. Qualifications (*highest qualification only*)	**145**		**73**

Secondary school		1	St 10 or equivalent		2
Post-school certificate/diploma		3	National Diploma/National Higher Diploma		4
Bachelor's degree or equivalent		5	Honours degree or equivalent		6
Master's degree or equivalent		7	Doctoral degree or equivalent		8

146. Work history: How long have you worked in this sector?	**146**		**74**

Less than six months		1	Ten to fifteen years		5
Six months to two years		2	Fifteen to twenty years		6
Two years to five years		3	Twenty to twenty five years		7
Five years to ten years		4	Over twenty five years		8

147. Marital Status:				**147**		**75**
Single	1	Married	2			

Divorced	3	Widow/ widower	4	Co-habiting	5

148. **Home language**: *(Mark one language only)*

Afrikaans	01	Zulu	05	Tsonga	09
English	02	Ndebele	06	Tswana	10
Xhosa	03	South Sotho	07	Swazi	11
Venda	04	North Sotho	08	Sign Language	12
Others:	13	**Please specify..**			

148		**76 -77**	

149	How many years project management experience do you have as a **team member ? ___**	**149**	**78 -79**
150	How many years of project management experience do you have as **a project manager? ___**	**150**	**80**

Thank you for taking the time to complete this questionnaire.

All information will be treated as confidential.
Please e-mail completed questionnaire to: ydupless@hakuna.up.ac.za **or send to:**
Yvonne du Plessis
Room 3-80, E & B building
Department of Human Resources Management
University of Pretoria

PROJECT MANAGEMENT CULTURE TOOL (PMCAT)

20 minutes of your valuable time, well spend!!!

Dear participant

You have been selected, due to your specialisation in project management, to participate in this study. The aim of this questionnaire is to test an instrument that was developed to assess the "project management culture" in organisations.

This is the final part of a PhD Thesis conducted by Yvonne du Plessis, at the University of Pretoria in the Faculty of Economics and Management Sciences.

You are kindly requested to complete the following questionnaire, which should not take longer than **20 minutes.** Please forward the completed questionnaire electronically to Yvonne du Plessis **by 10 August 2003.**

ydupless@hakuna.up.ac.za

If you have any questions you are welcome to contact me at 0833056227 or on my e-mail.

Thank you very much for your support.

Kind regards

Yvonne du Plessis

TESTING INSTRUMENT

PROJECT MANAGEMENT CULTURE TOOL (PMCAT)

Please complete the following questionnaire. This questionnaire contains statements relating to the characteristics of a 'Project Management Culture', i.e. 'the way things are done in project environments' to facilitate project success. **Each item must be rated** on a five-point scale whether you agree with the statement or not. Use the following guidelines.

1 = strongly disagree
2 = disagree
3 = neither disagree or agree
4 = agree
5 = strongly agree

There are no right or wrong answers. Respond to each statement in an honest manner, based on **your personal experience in and perception of projects and project management in your workplace/organisation.**

For office use only			
1	**Respondent number**		**1-3**
2	**Card number**	**0** **1**	**4-5**
3	**Repeat number**		**6**
Please rate each of the following statements as per rating scale:		**Rate**	
4	There is a good relationship amongst the team members		**7**
5	Conflict within teams are recognised and dealt with		**8**
6	External project environmental changes are frequently monitored		**9**
7	Decisions are made quickly		**10**
8	Team members are allowed to take initiative in problem solving		**11**
9	There is a strong sense of belonging between the project team members		**12**
10	There is a high degree of trust between senior management and team members		**13**
11	There is a positive relationship between the project manager and senior management		**14**
12	The project manager's leadership helps to achieve the results		**15**
13	The project process is clearly visualised during the design phase		**16**
14	Rewards and recognition are used to increase motivation in projects		**17**
15	Each team member is disciplined to deliver according to plan		**18**
16	Risk is monitored on a continuous basis		**19**
17	Politics and power are managed before the project implementation		**20**
18	Customer expectations are clearly defined		**21**
19	The project is clearly structured by means of work breakdown structures, definite start and finishing dates, (budget, resource allocation, etc?)		**22**
20	Deadlines are mostly met		**23**

21	There is a high tolerance for conflict		24
22	Interdependence amongst stakeholders is recognised		25
23	External stakeholders' expectations are clearly defined		26
24	Individual performance is evaluated according to the project goals		27
25	The project process is focused on delivering project outcomes		28
26	Project mistakes are openly discussed		29
27	The work break down structure is used as a selection criteria for team members		30
28	The project team has a good relationship with the various suppliers		31
29	The project team is viewed as credible		32
30	The project process is clearly described		33
31	Calculated risk taking is encouraged		34
32	Team work is regarded as important for project success		35
33	The project manager has a good relationship with the customer		36
34	Utilising project methodology and tools are regarded as being important for project success		37
35	Uncertainty is dealt with through open communication		38
36	The project manager has a good relationship with the various suppliers		39
37	Management provides sufficient resources for the project		40
38	Meetings and red tape procedures are kept to a minimum in the project life cycle		41
39	Team activities take place in an organised fashion		42
40	Teams have structural flexibility to perform their tasks		43
41	Business is conducted in an ethical manner		44
42	Budgets are not exceeded		45
43	Work activities are organised around the team		46
44	Projects form part of the organisations strategy.		47
45	Team members look out for each other's interest		48
46	Rapport is maintained between senior management and project teams		49
47	Past project experiences and mistakes are well documented		50
48	Project teams are capable of responding immediately to changes in the external environment		51
49	There is a clear project plan		52
50	The project manager's style is adaptive to the different project phases		53
51	The team has faith in the project manager		54
52	Teams are penalized for failures and mistakes		55
53	The project process is focused on results		56
54	Each team member has a clear understanding of his/her role		57
55	The progress of the project is carefully and systematically monitored		58
56	The team has the authority to make decisions		59
57	The project manager gets on well with the project members.		60

58	The team is responsible for solutions of problems		**61**
59	It does not matter what means are used to achieve project results, as long as the results are achieved		**62**
60	Business facts and objectives drive the project rather than emotions		**63**
61	Team members are committed to the success of the project		**64**
62	The project manager is well trained in project management theory and practice		**65**
63	The results of the project influence individual performance appraisal		**66**
64	There are regular communication sessions		**67**
65	The project plan consists of clear milestones		**68**
66	Rewards are allocated on the basis of team results		**69**
67	Interpersonal conflict and differences are managed in a constructive way for mutual benefit		**70**
68	Understanding project methodology and tools are important for project success		**71**
69	All relevant stakeholders are disciplined to deliver according to plan		**72**
70	The team's performance is evaluated according to the project goals		**73**
71	There are clearly defined control measures		**74**
72	Rewards are based on individual performances		**75**
73	Team members are encouraged to learn from past mistakes.		**76**
74	Team members are carefully selected for each project		**77**
75	Networking is encouraged in our organisation		**78**
76	Each team member knows exactly what he/she is responsible for		**79**
77	Management is enthusiastic about the projects		**80**
78	Feedback on project progress is provided on a regular basis		**81**
79	The organization's structure supports project teams		**82**
80	The project manager is viewed as being credible		**83**
81	The project follows the phases according to the project life cycle		**84**
82	Management interferes with decision making procedures		**85**
83	Project team leadership is focused on a competent team		**86**
84	Management provides sufficient support for the projects		**87**
85	There is a high degree of trust amongst the various stakeholders		**88**
86	The project performance is influenced by the team performance		**89**
87	Teams receive support from other teams when necessary		**90**
88	The project environment encourages innovation and creativity		**91**
89	Team members have direct access to project information		**92**
90	Organisational goals supercedes personal agendas		**93**
91	Team members have the courage to view their criticism openly		**94**
92	Feasibility studies are done before every project is implemented		**95**

SAVE INPUTS

Biographical information

Please provide the following information about yourself by marking the relevant number

								For office use only
96. Age								
25 years or less	*1*	26 - 30 years	*2*	31 - 35 years	*3*	36-40 years	*4*	
41 - 45 years	*5*	46-50 years	*6*	51-55 years	*7*	Over 55 years	*8*	
97.Gender	Male		1	Female		2		
98. The economic sector in which you are working: *(Mark one sector only)*								

Primary Sector			
Agriculture, forestry and fishing		01	
Mining and quarrying		02	
Secondary sector			
Manufacturing		03	
Electricity, gas and water		04	
Construction (contractors)		05	
Tertiary sector			
Wholesale and retail trade, catering and accommodation		06	
Transport, storage and communication		07	
Financial intermediation, insurance, real estate and business services		08	
Community, social and personal services		09	
General government services		10	
Others (please name)		11	
Other producers (please name)		12	

99. Qualifications (*highest qualification only*)					
Secondary school		1	St 10 or equivalent		2
Post-school certificate/diploma		3	National Diploma/National Higher Diploma		4
Bachelor's degree or equivalent		5	Honours degree or equivalent		6
Master's degree or equivalent		7	Doctoral degree or equivalent		8

100. Work history: How long have you worked in this sector?					
Less than six months		1	Ten to fifteen years		5
Six months to two years		2	Fifteen to twenty years		6
Two years to five years		3	Twenty to twenty five years		7
Five years to ten years		4	Over twenty five years		8

101. Marital Status:					
Single	1	Married	2		
Divorced	3	Widow/ widower	4	Co-habiting	5

102. **Home language**: *(Mark one language only)*					
Afrikaans	01	Zulu	05	Tsonga	09
English	02	Ndebele	06	Tswana	10
Xhosa	03	South Sotho	07	Swazi	11
Venda	04	North Sotho	08	Sign Language	12
Others:	13	**Please specify…..**			

103	How many years project management experience do you have as a **team member ?** ___
104	How many years of project management experience do you have as **a project manager?** ___

Please save your inputs!!

All information will be treated as confidential.
Please e-mail your completed questionnaire to:
ydupless@hakuna.up.ac.za

Thank you for taking the time to complete this questionnaire.