PART 1:

BACKGROUND AND CONTEXT

Chapter 1:

Problems in managing international projects – contextualising the research

1.1 Rationale for the research

With the advent of globalisation, project management is no longer a local issue, but an international affair that is risky in nature. “Project management is now well developed and well accepted as domain for the exercise of professional expertise and as an area for academic research and discourse. However, project management remains a highly problematical endeavour” (White & Fortune, 2002).

Changes in the global environment are presenting organisations with both opportunities and challenges (Yong & Javalgi, 2007). International contractors continue to attempt to function in the international construction industry. These international contractors should push themselves to meet international project management standards, and therefore improve their competitiveness (Ofori, 2000).

Since the 1950s, much of the work in project management has focused on project scheduling problems, assuming that the development of better scheduling techniques would result in better management and thus the successful completion of projects (Bellassi & Tukel, 1996). In the past number of years, project scheduling seems still to be a popular topic in project management research (Peteghem et al., 2010; Vonder et al., 2008; Lambrechts et al., 2008;Herroelen & Leus, 2005) .However, there are many factors outside the control of management that could determine the success or failure of a project, especially when managing international development projects (Bellassi & Tukel, 1996; Kendra & Taplin, 2004). Different projects should be managed in different ways (Sadeh, Dvir & Shenhar, 2010).Wang and Liu (2007) also argue that, for a project to succeed, the people involved "should not only learn and practice its tools and techniques but also learn, internalize and practice its work-related value/beliefs". Youker (1992) states that "the literature of project management places great emphasis on planning and management tools for the project manager to use to control time, cost, resources and quality of performance. However, a review of the results of project monitoring and evaluation on World Bank projects indicates that many of the key problems of implementation lie in the general environment of the project, and are not under the direct control of the project manager". The project management (PM) environment for international development projects is also much more complicated than domestic projects in industrialised countries (Kwak, 2002).

The knowledge and expertise required for domestic construction projects are not necessarily adequate for developing a strategy for international

construction projects. Project managers should understand the social, economic, political and cultural factors that affect the project environment (Howes & Tah, 2003).

“International construction is much riskier than domestic construction. The complex international environment is affected by diverse variables that are not part of domestic markets and that create risks never encountered in domestic conditions” (Gunhan & Arditi, 2005).

Lucas (1986) argues that managing projects in foreign environments provides unusual challenges. Even at that early stage he stated that the main concerns in international project management focus on understanding cultural differences, communications avoiding local politics and supervising an international group of senior professionals. International project managers therefore also encounter unique situations over and above the challenges that domestic project managers face (Murphy, 2005).

Form abovementioned discussion, it can be said that international projects are more complicated and risky than domestic projects. Some risks encountered in international projects are not the same as those in domestic projects. The cultural differences issue has been recognized as one of the main concerns in international projects management (Murphy, 2005; Pheng and Leong 2000). Although there may be also cultural differences in a domestic project team because of the team members’ difference in origin, international project teams seem to be more easily influenced by cultural differences. Simkhovych (2009) did an empirical research to examine the relationship between intercultural effectiveness and project team performance in the international development

field. Correlation analysis confirmed the relationship between intercultural effectiveness and project team performance. Chen and Partington (2004) did a study on comparison of Chinese and Western concepts of relationships in construction project management work. They examined the extent to which Western project management ideas have been supported by the Chinese culture, and recommend that practical considerations in specific situations should be based on the knowledge that project management is not universal, but culture sensitive. Kwak (2002) states that the "culture issue is the least known but the most hazardous in the context of international development projects".

With increasing globalisation, more and more project managers will be involved in the management of projects in foreign environments. The scope of this research is international projects in general; however more focus is on construction projects. Consequently, the research topic presented in this thesis will match this trend and focus on enriching project management (PM) theories.

1.2 Some problems in managing international projects

The following provides a preliminary review of some factors creating problems in the managing of international projects with a focus on construction. A more detailed appropriate review is provided in later chapters as part of the exploratory research on cultural influences in successful project management. This section essentially leads to the high level identification of research problems for this research in section 1.3

1.2.1 Problems encountered in international project management

Many researchers and practitioners (Murphy, 2005; Lucas, 1986; Youker, 1992; Howes & Tah, 2003) are aware of the challenge of managing international projects, since international projects face uncertainties caused by host country conditions (Ozorhon, Arditi, Dikmen & Brigonul, 2007). Researchers have previously identified some key factors that constrain the success of international projects.

1.2.1.1 Cultural differences

Pheng and Leong (2000) conducted research on international construction in China, and determined that cultural differences are a critical factor that can actually affect the outcome of an international project. For an international project manager, understanding key concepts in cross-cultural management and project management is the basic requirement in the era of globalisation. Muriithi and Crawford (2003) also argue that Western management concepts may be not applicable to other cultures that are not so deeply rooted in the Western philosophy. They suggest that appropriate modifications can be made to current management theories by studying cultural differences.

Large-scale international projects are of a global nature. Therefore, a high degree of coordination and communication is needed. Communication in the international environment is complicated by different languages, cultures and etiquette (Howes & Tah, 2003). Loosemore and Muslmani (1999) state that the

internationalisation in project management creates intercultural communication problems that result in significant misunderstanding and conflict.

1.2.1.2 Political factors

Khattab, Anchor and Davies (2007) did a study to examine the vulnerability of international projects to political risks. Their study results showed that political risks are ranked first by respondents. Other authors also mention that political interventions can sometimes decide the success of foreign-invested firms (Buckley, Clegg & Hui, 2006). Political risks are the key risks to successful international construction contracting (Ashley & Bonner, 1987). For international projects, these factors can produce problems that may not be problematic in domestic projects. Dikmen, Birgonul and Han (2007) state that political risk factors receive the most attention from researchers in international projects.

1.2.1.3 Legal factors

Murphy (2005) perceives legal issues as one of the difficulties and risks of international projects. Companies often find themselves in an unfamiliar legal environment when implementing an international project. The laws of the host country often apply to contracts. Gunhan and Arditi (2005) agree that legal factors are still a risk despite the lowering barriers of international business.

1.2.1.4 Economic factors

Researchers pay a great deal of attention to economic risk factors in international projects (Dikmen, Birgonul & Han, 2007). Zhi (1995) states that economic factors are one of the international project risks associated with the host country. Miller (1992) believes that macroeconomic factors are one of the great uncertainties for international businesses.

1.3 Description of research problems

It should be evident from the high level discussions in the previous sections that managing international projects is a challenge for project managers. A number of unique constraining factors arising from foreign business environments have negative impacts on international projects and specifically construction type projects. The management of these constraining factors is a critical issue for international project success. In the brief literature review presented in the previous section, it was stated that social, economic, political, cultural, communication and legal factors were some of the constraining factors for international project success (Ling & Hoi, 2006; Ofori, 2003; Han & Diekmann, 2001). The authors mentioned agree that the main problems when managing international projects are no longer controlling and scheduling. However, very few academics and practitioners have done further research linking these constraining factors with project management practices. Some previous researchers stopped at identifying the problems caused by the abovementioned factors and did not really design systematic methods to overcome this barrier (Kwak, 2006; Shore & Cross, 2005; Loosemore &

Muslmani, 1999) Wang and Liu did a study on how to overcome the cultural barriers of Western project management in Chinese firms in 2007. The author has stated that the literature review did not reveal an appropriate empirical study focusing on how to modify project management practices to fit the Chinese culture or how to modify Chinese approaches.

Murphy and Ofori also highlighted some problems in international project research. Murphy (2005) describes the situation of research on international projects as follows: “In more than 20 years of managing international projects, I never found a definitive guide to help me perform my responsibilities to make a project succeed to the expectations of the company.”

Ofori (2003) states that the “international project has many peculiarities and problems, the impact of which will intensify in future. There is no suitable framework for analysing the factors that influence success in international construction.”

1.4 Research objectives

The overall aim of this research is to develop a systematic framework for the modelling, analysis and management of constraining factors in international projects. The aim is then to establish a linkage between cultural differences and project management activities and to control as well as mitigate the negative effects of cultural differences.

In order to achieve the overall objective, the research will:

- Identify typical Chinese behaviours and establish how Chinese behaviours affect project management activities.
- Do a comparative research of Chinese and South African project managers to identify the risks arising from cultural differences.
- Attempt to improve project team performance dynamics through a systematic analysis of risks arising from cultural differences.
- Research relevant knowledge related to cultural differences, project success and international project management.
- Find out how international project managers overcome these constraint factors in practice.
- Develop a systematic framework for the modelling, analysis and management of cultural differences in international projects.

1.5 The contributions of this research

The main contribution of this research is to explore the effects of cultural differences on project management activities and then establish the linkage between cultural differences with project management activities. This study takes the Chinese cultural behaviours as the base culture and compares the behaviours of South African and Chinese project managers. The results will fill the gap in the abovementioned perspective on the international project management arena. The focus of this research is more on construction type projects and there is no specific focus on international high technology or R and D projects.

More details of the main contributions are as follows:

- Contribute to the knowledge of managing projects in multicultural environments and cross-cultural studies in project management, especially to the South African and Chinese perspectives.
- Give a systematic description of the relevant aspects of Chinese culture and their effects on project management activities.
- The comparative data analysis of Chinese and South African project managers has implications for international project managers to handle the cultural differences between these two countries.
- The proposed model builds a linkage between cultural differences and project activities. Moreover, the proposed model will be evaluated by the empirical data.

1.6 A brief introduction to the research methodology

A combination of quantitative and qualitative research instruments was employed in this research. Primary data gathering was performed by means of questionnaires distributed to Chinese and South African project managers. Although the questionnaire was basically designed for the Chinese culture, South African project managers were also asked to participate in the survey in order to observe the differences. Descriptive analysis was performed to show the means and standard deviations of the variables (cultural behaviours). Moreover, independent sample t-tests were done to explore group differences between the Chinese and South African participants with regard to cultural behaviours. Spearman's rho correlation analysis was also used to explore the

relationships or correlations between some of the variables in the model presented to aid in the understanding of project management in this international context. Although Spearman's rho correlation used in this study does not imply causality, some useful correlations have been established between parameters in the proposed conceptual framework for the modelling, analysis and management of cultural differences in international projects. Future research outside the scope of this thesis will focus on evaluation of detailed relationships and causality in the proposed framework

1.7 The structure of the thesis

The thesis is subdivided into three parts with eight chapters, as described in the following research roadmap:

Part 1 contains two chapters. In this section, the basic research questions to be explored are defined. The background and the importance of the research issues are addressed. The background and context of this research are described. Some key theoretical and literature concepts are addressed in Chapter 2. A literature review is specifically conducted on critical success factors. Secondary research is conducted on the relevant literature in this field. The impact of the existing literature on the current research is evaluated. The relevant literature on project success and project success measurement is placed in a general context to aid in the appreciation of the proposed model.

Part 2 has three chapters. The relevant existing literature on international projects is researched in Chapter 3. The appropriate and relevant literature

and models for international project management are presented in this chapter. The shortcomings of previous research studies are addressed in Chapter 4 after a more comprehensive literature review. A primary model is developed from the literature study and presented in Chapter 5. The key attributes of the desired model are also addressed in this chapter.

Part 3 addresses the research design, data gathering and analysis. In this section, the study methodology of the survey is presented and a questionnaire, designed according to the research purposes in Chapter 6, is presented. A design survey research process is applied to obtain appropriate primary information. In Chapter 7, a combination of quantitative and qualitative research instruments is employed during the primary data-gathering and analysis process. In the analysing process, some statistical tools are applied to obtain scientific results. A comparative survey research method will be applied in this research as the research strategy and respondents from China and South Africa are selected. The data is analysed on three levels. In the data-analysis process, the research objectives are discussed and assessed. Some statistical correlation tests are also employed to build confidence in some of the relationships suggested in the proposed model. Chapter 8 presents the conclusions of the research, modifies the primary model according to the research findings and presents the final model. Some limitations of this research and recommendations for future research are also addressed in Chapter 8.

Chapter 2:

Assessment of key concepts that are relevant to international project management

2.1 Introduction

Understanding the appropriate key concepts is crucial to the study. This section examines some specific concepts related to international project management that are employed in this research. Literature that is relevant to the success of the project will also be addressed in the sense that it provides context and background for appreciation of the model to be proposed and evaluated in the ensuing chapters.

2.2 Assessment of key concepts

2.2.1 Dimensions of a project

A project may be defined in several different ways.

As far back as in 1983, Tuman defined a project as follows (in Pinto, 1986): “A project is an organisation of people dedicated to a specific purpose or objective. Projects generally involve large, expensive, unique, or high risk undertakings which have to be completed by a certain date, for a certain amount of money, within some expected level of performance. At a minimum,

all projects need to have well defined objectives and sufficient resources to carry out all the required tasks." A project is a combination of human and nonhuman resources pulled together in a temporary organisation to achieve a specified purpose (Cleland & Kerzner, 1985).

Archibald (in Shtub, Bard & Globerson, 1994) stated in 1976 that a project is the entire process required to produce a new plant, new system, or other specified results.

PMBOK (2008) defines a project as "a temporary endeavour undertaken to create a unique product, service, or result".

From the definitions above, the characteristics of a project can be summarised as follows:

- A project is a temporary, pre-planned endeavour with a beginning and an end
- A project has specific objectives that can be evaluated
- Every project is unique; all projects differ from each other
- A project needs different resources to achieve the desired deliverables

2.2.2 The differences between projects and products

Projects are different from products in many respects.

"Products are what the organisation is in business to make, deliver or sell, as stated in its mission. They maybe manufactured goods or services. Products generate revenue and therefore deliver the purpose or benefit of the project" (Knipe, Waldt, Niekerk, Burger & Nell, 2002).

The products of a project may for example be a bridge, or a sports stadium. The deliverables of projects are products. The description that projects are a temporary endeavour does not mean that the products and services they produce are temporary (Michael and Marina, 2004). The products of projects are generally ongoing for long periods and do not necessarily have a definite ending point. Projects, as compared to products, have a definite ending because they are scheduled to be completed within a specific time period This may have implications where for example team members in international teams have different cultural context and time conception behaviour specifically pertaining to the product that the project is supposed to deliver.

2.2.3 Brief review of project management

Although there are many different definitions of project management (PM), most of them are similar in that they contain the same elements.

Levine (1986) states that project management can be defined as the "planning, organising, directing, and controlling of resources for a specific time period to meet a specific set of one-time objectives".

"Project management is the application of knowledge, skills, tools and techniques to project activities in order to meet or exceed stakeholder needs and expectations from a project" (Duncan, 1996).

In their book, Harrison and Dennis (2004) define project management as “the achievement of project objectives through people and involving the organization, planning and control of resources assigned to the project”. The purpose of project management is achieved for the set project objectives in a risky environment.

According to the definition issued by the Project Management Institute, “project management is the application of knowledge, skills, tools, and techniques to project activities to meet project requirements. Project management is accomplished through the appropriate application and integration of the 42 logically grouped project management processes comprising the 5 Process Groups (initiating, planning, executing, controlling, and closing)” (PMBOK 2008).

From these definitions, some common aspects of project management can be summarised:

- Effective management, including planning, controlling, organising and executing
- Meeting stakeholder requirements
- Project objective-orientated work
- The application of knowledge, skills, tools, techniques and methods

2.2.4 The body of project management knowledge and standards

PMBOK (2008) provides a framework of project management knowledge areas. Project management and practice are described in terms of their component processes. These processes have been organised into nine knowledge areas (Table 2.1). This table, and the following Table 2.2 are shown here for inter alia easy reference and to assess directly where cultural impact may occur; for example as part of the perform quality assurance activity under the Executing Process Group and Project Quality Management knowledge area as well part of the monitor and control risk activity under the Project Risk Management knowledge area.

- "Project integration management includes the processes and activities needed to identify, define, combine, unify, and coordinate the various processes and project activities within the project management process groups.
- Project scope management includes the processes required to ensure that the project includes all the work required, and only the work required, to complete the project successfully.
- Project time management includes the processes required to manage timely completion of the project.
- Project cost management includes the processes involved in estimating, budgeting, and controlling costs so that the project can be completed within the approved budget.
- Project quality management describes the processes and activities of the performing organisation that determine quality polices, objectives, and

responsibilities so that the project will satisfy the needs for which it was undertaken.

- Project human resource management includes the processes that organise, manage and lead the project team.
- Project communications management includes the processes required to ensure timely and appropriate generation, collection, distribution, storage, retrieval, and ultimate disposition of project information.
- Project risk management includes the processes of conducting risk management planning, identification, analysis, response planning, and monitoring and control on a project.
- Project procurement management includes the processes necessary to purchase or acquire products, services, or results needed from outside the project team."

Table 2.1 shows that the IPMA (International Project Management Association) has developed the ICB (IPMA Competence Baseline), which is considered to be another global standard in project management (Pannenbäcker, Knofel & Communier, 2002).

Table 2.1: Overview of project management knowledge areas and project management processes

Project Management Process Groups					
Knowledge Areas	**Initiating Process Group**	**Planning Process Group**	**Executing Process Group**	**Monitoring and Controlling Process Group**	**Closing Process Group**
Project Integration Management	Develop project charter	Develop project management plan	Direct and manage project execution	Monitor and control project work Perform integrated change control	Close project or phase
Project Scope Management		Collect requirements Define scope Create WBS		Verify scope Control scope	
Project Time Management		Define activities Sequence activities Estimate activity resources Estimate activity durations Develop schedule		Control schedule	
Project Cost management		Estimate costs Determine budget		Control costs	
Project Quality Management		Plan quality	Perform quality assurance	Perform quality control	
Project Human Resource Management		Develop human resource plan	Acquire project team Develop project team Manage project team		
Project Communication Management	Identify stakeholders	Plan communication	Distribute information Manage stakeholder expectations	Report performance	
Project Risk Management		Plan risk management Identify risks Perform qualitative risk analysis Perform quantitative risk analysis Plan risk responses		Monitor and control risks	
Project Procurement Management		Plan procurement	Conduct procurements	Administer procurements	Close Procure-ments

(PMBOK, 2008)

"The ICB contains basic terms, tasks, practices, skills, functions, management processes, methods, techniques and tools that are commonly used in project management, as well as advanced knowledge, where appropriate, of innovative and advanced practices used in more limited situations" (IPMA Certification Yearbook 2005). Cultural behaviour may again be considered important in for instance element 2.14, values appreciation in Table 2.2.

Table 2.2: IPMA competence baseline

Technical competence elements		Behavioural competence elements		Contextual competence elements	
1.01	Project management success	2.01	Leadership	3.01	Project orientation
1.02	Interested parties	2.02	Engagement & motivation	3.02	Programme orientation
1.03	Project requirements & objectives	2.03	Self-control	3.03	Portfolio orientation
1.04	Risk & opportunity	2.04	Assertiveness	3.04	Project, programme & portfolio implementation
1.05	Quality	2.05	Relaxation	3.05	Permanent organisation
1.06	Project organisation	2.06	Openness	3.06	Business
1.07	Teamwork	2.07	Creativity	3.07	Systems, products & technology
1.08	Problem resolution	2.08	Results orientation	3.08	Personnel management
1.09	Project structures	2.09	Efficiency	3.09	Health, security, safety & environment
1.10	Scope & deliverables	2.10	Consultation	3.10	Finance
1.11	Time & project phases	2.11	Negotiation	3.11	Legal
1.12	Resources	2.12	Conflict & crisis		
1.13	Cost & finance	2.13	Reliability		
1.14	Procurement & contract	2.14	Values appreciation		
1.15	Changes	2.15	Ethics		
1.16	Control & reports				
1.17	Information & documentation				
1.18	Communication				
1.19	Start-up				
1.20	Close-out				

(IPMA Certification Yearbook, 2005)

2.2.5 Evaluation of an international project

Clifford and Erik (2000) classify projects as domestic, overseas, foreign and global projects. They state that a domestic project is one performed in its native country, an overseas project is one executed in a foreign country for a native firm, a foreign project is executed in a foreign country for a foreign firm, and a global project is implemented in multiple counties. They categorise projects executed elsewhere than in the native country as international projects. Ling, Ibbs and Hoo (2006) also state that an international project is one located outside the country where the company headquarters is based.

2.2.6 Foreign business environment

A business environment is created by factors such as the economic, cultural, legal, regulatory, financial, natural, institutional system and technical factors of a host country. The business environment is a rapidly changing environment (Collyer & Warren, 2009). Every country has its own unique business environment characteristics. The variety of business environment across regions and countries is commonly accepted as a barrier to doing business (Commander, Svejnar & Tinn, 2008). In this research study, a business environment that is out of one's native country is considered as a foreign environment. It is a key challenge for managers to understand uncertainty in the business environment (Burt, 2006).

2.2.7 The characteristics of an international project management team

Teams are very common in our lives. We often encounter a basketball team, soccer team, study team and so on. At the highest conceptual level, a team can be defined as a collection of people who work together to achieve a common goal (Frame, 1999).

Michael and Marina (2004) state that a project team is “a small number of people with complementary skills who are committed to a common purpose, performance, goals, and approach”. In some projects, the project team can also include other interested entities, such as stakeholders, client representatives and environmentalists. The project manager is the team leader whose responsibilities are to use a series of team development skills to improve the team performance.

A project team has at least the following components:

- a project manager who needs to motivate the team members and solve the conflicts among team members;
- goals that need to be established before project team building; and
- a group of people who have the necessary skills and commitment.

An international project management team also contains the abovementioned elements. Members of international teams differ from each other in many important ways: gender, thinking style, cultural background, function, profession and so on. In this research, a project team is considered to be an

international project management team when it contains the following elements (although it is recognised that some international teams have team members with the same native language):

- team members from different nationalities
- team members who do not have the same cultural background
- the native language of all the team members is not the same

Although this is simplistically represented, it concurs in a sense with the representation of virtual teams on four continua by Zigurs (2003):

- organisational dispersion
- geographical dispersion
- temporal dispersion
- cultural dispersion

This research thesis is then concerned mainly with the cultural and geographical dispersion elements of international teams that, under certain circumstances, may be considered as virtual teams (Zigurs, 2003; Lee-Kelly & Sankey, 2008).

Ochieng and Price (2010) state that little research has been done into multicultural teams on construction projects and that many international operations are often unable to deal with cultural factors. To a large extent the research in this thesis is then concerned with international teams on construction type projects

2.2.8 Project success review

As this research to some extent proposes that international project activities leading to project success is somehow dependant also on cultural behaviour it seems appropriate to explore to some extent the concept of project success. The first step in exploring and measuring project success is to reach consensus on the definition of "project success" (Dvir, Lipovetsky, Shenhar & Tishler, 1998; Tishler, Dvir, Shenhar & Lipovetsky, 1996; Diallo & Thuillier, 2004). In fact, the definition of "project success" has been researched by practitioners and academics for many years. However, there is still no consistent interpretation of the definition of "project success". Project success represents different meanings to different people with different viewpoints.

As far back as in1988, Pinto and Slevin pointed out that "there are few topics in the field of project management that are so frequently discussed and yet so rarely agreed upon as the notion of project success". In the same year, Baker, Murphy and Fisher (1988) proposed another definition of success: "If the project meets the technical performance specifications and/or mission to be performed, and if there is a high level of satisfaction concerning the project outcome among: key people in the parent organization, key people in the client organization, key people on the project team, and key users or clientele of the project effort, the project is considered an overall success."

Some researchers and practitioners believe that project success is "perceived" in nature. Pariff and Sanvido (1993) state that "success" is an intangible

perspective feeling, a measuring criterion that varies with management expectations and varies among persons and with phases of project. Success is only “perceived success” (Diallo & Thuillier, 2004; Baker, Murphy & Fisher, 1988). Freeman and Beale (1992) give a very interesting example to describe “perceived project success”:

“An architect may consider success in terms of aesthetic appearance, an engineer in terms of technical competence, an accountant in terms of dollars spent under budget, a human resources manager in terms of employee satisfaction. Chief executive officers rate their success in the stock market.”

Other academics also have the perception that the assessment of a project’s success may differ, depending on the point of view of the person evaluating it (Lipovetsky, Tishler, Dvir & Shenhar, 1997; Lim & Mohamed, 1999; Bryde & Robinson, 2005; Shenhar & Levy, Dvir, 1997). Chan, Scott and Lam (2002) also argue: “The general concept of project success remains ambiguously defined because of varying perceptions, such a phenomenon also exists in the construction industry where different parties are involved, including the client, the architect, the contractor, and various surveyors and engineers.”

De Wit (1988) and Baccarini (1999) advocate that, before measuring project success, one must first distinguish between project success and project management success, because their objectives are not the same. Yu, Flett and Bowers (2005) agree that different definitions of the term “project” might warrant different success criteria. There is no universal checklist of project success criteria suitable for all projects. Success criteria will differ from project

to project. The issue of project success is far more subtle than the golden triangle (time, budget and required quality) (Westerveld, 2003). Apparently, there can be ambiguity in determining whether a project is a success or a failure. There are two main reasons for this ambiguity. One is that different parties perceive project success or failure differently; another is that lists of success or failure factors vary in various studies in the literature (Belassi & Tukel, 1996). Therefore, defining the concept of project success is an intractable issue.

Baccarini (1999) agrees that the measurement of project success is not an easy endeavour. He generalises the characteristics of project success as follows:

- It has “hard” and “soft” dimensions
- The project is perceived
- Success criteria must be prioritised
- Success is affected by time
- Success is not always manageable
- Success may be partial

Some academics link project success measurement with the organisation’s strategy management. Project success is strongly linked to an organisation’s success and effectiveness in the long run. The assessment of project success is a multidimensional framework. Such a framework should connect with the organisation’s strategy management and project selection as well as project

initiation from top-level decisions. To assess a project's success, one needs to understand the distinct dimensions and address different timeframes – from short-term to long-term. The specific success dimensions and their relevant importance will vary according to different projects (Shenhar，Dvir，Levy & Maltz, 2001; Diallo & Thuillier, 2004, Khang　Moe, 2008).

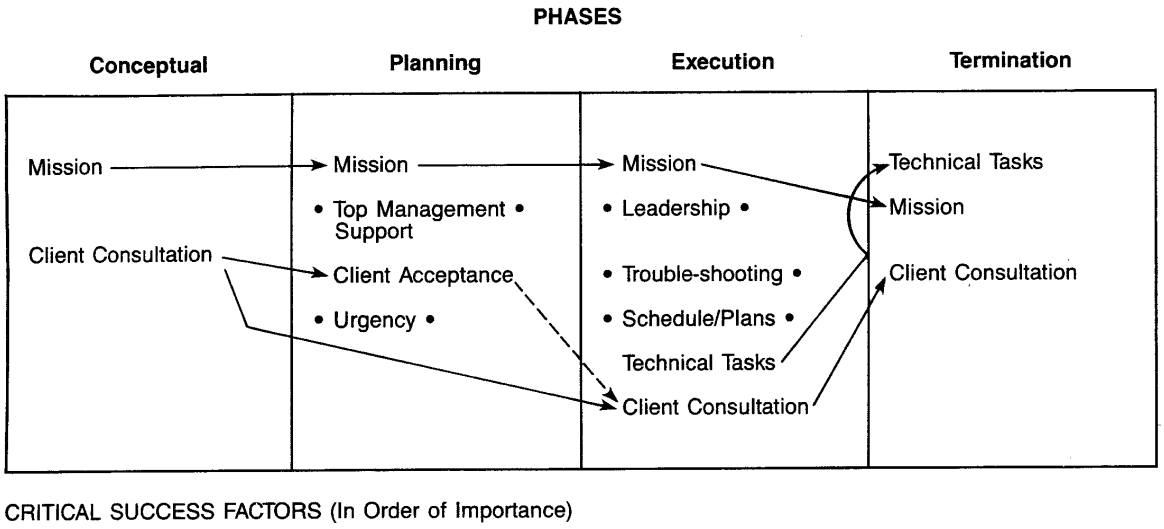
2.3 Critical project success factors review

The search for factors that influence project success or failure has been of great interest to both researchers and practitioners (Pinto & Mantel, 1990). Since the 1950s most work in project management has focused on project scheduling problems, assuming that the development of better scheduling techniques would result in better management and thus the successful completion of projects. However, there are many factors besides scheduling that could determine the success or failure of a project (Belassi & Tukel, 1996). Wang and Liu (2008) have a similar opinion. They state that a PM organisation should study project management techniques and cultural values to achieve a successful project.　Project success factors were also introduced by Rubin and Seeling (in Belassi & Tukel, 1996) in 1967. They identified technical performance as a measure of success and pointed out that the project manager's experience has a minimal impact but that the size of previously managed projects affects the manager's performance. The following reviews are in a chronological order:

Pinto and Slevin (1988) found ten factors (see Figure 2.1) to be of primary importance with regard to successful project management throughout the

lifecycle of a project. Their results were based on a survey of the literature and interviews with project and programme managers. The ten general factors that they found to be critical to the successful implementation of a project can be applied to a wide variety of project types and organisations. These factors served as the basis for a measurement instrument, the project implementation profile, which allows for an assessment of an organisation's ability to carry a project through to full implementation (Pinto et al., 1990).

Figure 2.1: The critical success factors across the project life cycle



(Pinto & Slevin, 1988)

The ten factors are:

1. Project mission: initial clarity of objective and general directions.
2. Management support: willingness of top management to provide the necessary resources and authority/power for project success.
3. Project schedule/plans: a detailed specification of the individual action steps required for project implementation.

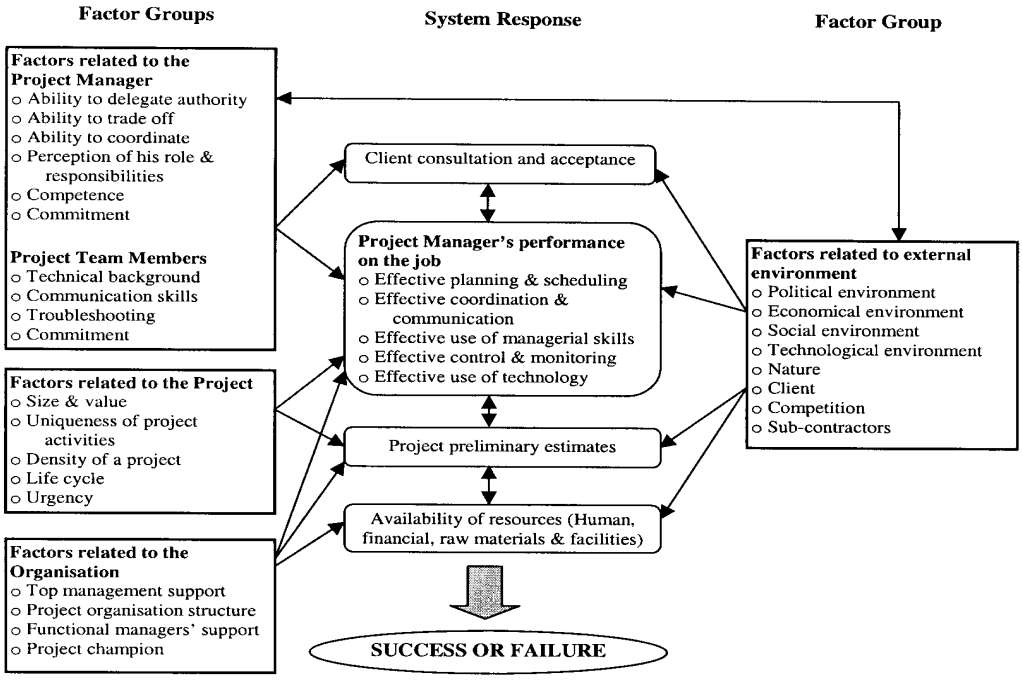
4. Client consultation: communication and consultation, listening to all parties involved.
5. Technical tasks: availability of the required technology and expertise to accomplish the specific technical action steps.
6. Client acceptance: the act of “selling” the final projects to their ultimate intended users.
7. Monitoring and feedback: timely provision of comprehensive control information at each stage of the implementation process.
8. Communication: the provision of an appropriate network and necessary data to all key actors.
9. Troubleshooting: the ability to handle unexpected crises and deviations from plan.
10. Personnel (recruitment, selection and training): recruitment, selection and training of the necessary personnel for the team.

In a study conducted by Belassi and Tukel in 1996, they found that there is ambiguity in determining, by researching existing literature of the field, whether a project is a success or a failure. There are two reasons for this ambiguity. First, as mentioned in a paper by Pinto and Slevin (in Belassi et al., 1996), it is still not clear how project success should be measured, because the parties who are involved in projects perceive project success or failure subjectively. The second reason, which is the motivation of their study, is that they found that the existing literature seems to tabulate individual factors rather than grouping them according to some criteria to help analyse their interaction and the possible consequences. They also state that many of these factors do not, in practice, directly affect project success or failure. Usually a combination of

many factors, at different stages of the project life cycle, results in project success or failure. They tried to determine the combined effects of these factors that eventually lead to project success or failure, instead of analysing individual factors.

The new framework of project success factors that they developed is given in Figure 2.2. The factors are categorised into four areas.

Figure 2.2: The new framework of success factors



(Belassi et al., 1996)

Tishler, Dvir, Shenhar and Lipovetsky published an article in 1996 on discovering the critical factors that are relevant to the success of defence projects by researching 110 defence projects executed in Israel over 20 years. The main factors found to be critical to the success of defence projects are:

Urgency of need

The extent to which the project is acknowledged as being urgent by the developing organisation and by the end-user.

Quality of the follow-up team

The team's level of professional expertise and its sense of responsibility for the success of the project are the most important variables in determining success.

Pre-project preparation

This refers to the preparations made by the contractor before actually commencing development. The most important variables in this factor are proving the technological feasibility of the project, evaluating the implications for project performance of the organisational structure and logistic processes, and the establishment of an appropriate organisational structure.

Quality of the development team and of its manager

The professional and managerial qualifications of this team and the team spirit are the most important variables of this factor.

Professional growth and continuity

An organisational culture encourages professional growth and prolonged periods of work on the same project.

Design policy of the developing organisation

Clear policy regarding decision-making procedures and internal and external communication procedures seems to contribute greatly to project success.

Design considerations in the early phases of the development cycle

Quality and reliability, produceability, and design-to-cost considerations exhibit high correlations with all dimensions of success.

Systematic use of methods to control schedule, budget and performance

These methods are used to detect problems as soon as they occur.

Dvir et al. (2006) used neural networks and linear regression to identify critical managerial success factors. The results showed that two analysis tools lead to different success factors with the same data. Some results that were obtained are listed in table 2.3. The number of variables in table 2.3 is to describe how well a certain managerial task was executed during the development process.

Table 2.3: Eight most important factors—regression vs. neural network

Neural network	No. of variables	Regression	No. of variables
Essential and urgent operational need	2	Essential and urgent operational need	1
Cohesion of the development team	2	Definition of operational and technical requirements	4
Quality of the escorting team	3	General-level management and delegation of authority	3
Involvement of the developing organization in the project definition	1	Existence of learning mechanisms in the development team	2
Existence of learning mechanisms in the development team	2	Existence of appropriate technological infrastructure at the developing organization	1
Budget and technical control	3	Involvement in the decision making process and open communication	2
Definition of operational and technical requirements	6	Managerial qualifications within the developing team	2
Managerial qualifications of the project manger	3	Cohesion of the development team	2

Dvir et al., (2006)

Cooke-Davies (2001) found 11 factors that are critical to comprehensive project success by answering three questions, namely:

- What factors lead to project success?
- What factors lead to a successful project?
- What factors lead to consistently successful projects?

He found that, in spite of many well-known research results and much literature on project management, despite decades of individual and collective experience of managing projects, despite the rapid growth in membership of project management professional bodies, and despite a dramatic increase in the amount of projects working in industry, project results continue to disappoint stakeholders. Thus, Cooke-Davies asked the question "What are the critical factors that really lead to a successful project?"

Therefore, his study is naturally based on answering the questions below.

Question 1: What factors are critical to project management success?

The answer is:

Those practices that correlate to on-time performance are:

- Adequacy of company – wide education on the concepts of risk management.
- Maturity of an organisation's processes for assigning ownership of risks.
- Adequacy with which a visible risk register is maintained.
- Adequacy of an up-to-date risk management plan.
- Adequacy of documentation of organisational responsibilities on the project.
- Keep project (or project stage duration) as far below three years as possible (one year is better).

Those that correlate to on-cost performance are:

- Allow change to scope only through a mature scope-change control process.
- Maintain the integrity of the performance measurement baseline.

Question 2: What factors are critical to success on an individual project?

The answer is:

The existence of an effective benefits delivery and management process that involves the mutual cooperation of project management and line management functions.

Question 3: What factors lead to consistently successful projects?

The answer is:

- Portfolio and programme management practices that allow the enterprise to resource fully a suite of projects that is thoughtfully and dynamically matched to the corporate strategy and business objectives.
- A suite of project, programme and portfolio metrics that provide direct “line of sight” feedback on current project performance and anticipated future success, so that project, portfolio and corporate decisions can be aligned.

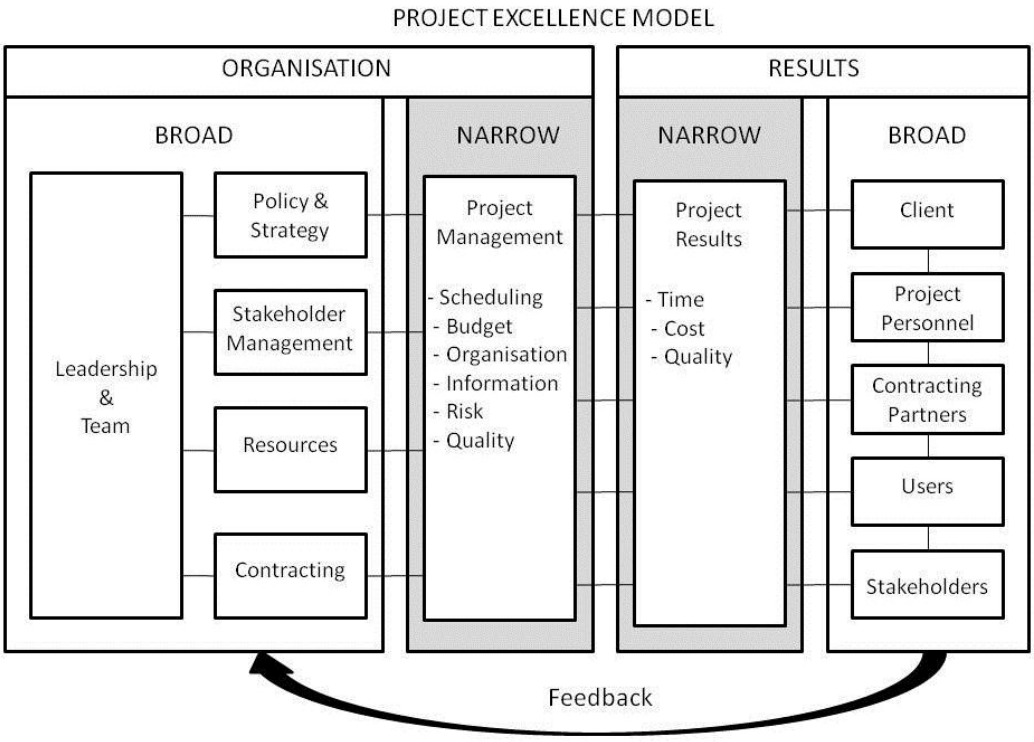
- An effective means of “learning from experience” on projects, which combines explicit knowledge with tacit knowledge in a way that encourages people to learn and to embed that learning into continuous improvement of project management processes and practices.

Westerveld, who created a project excellence model in 2003 (Figure 2.3), firstly built the linkage between success criteria and critical success factors. In his article, he generalises the critical success factors in a “project excellence model” as follows:

- Leadership and team: Represents the way the project manager runs the project and how tasks and responsibilities are divided. Leadership style of and cooperation in the project team greatly influence the working habits within the project organisation.
- Policy and strategy: What are the project goals and how are they accomplished? It is necessary to combine the interests of stakeholders into an end product.
- Stakeholder management: How does the project interact with various stakeholders? The cooperation of the project organisation with external parties determines the place of the project in its environment.
- Resources: Resources have to be utilised in an effective and efficient manner in order to achieve maximum benefit to the stakeholders involved.
- Contracting: Each project organisation establishes contractual relationships. The choices of contracts and partners evolve around the tasks at hand and the competencies of contracting parties.

- Project management (scheduling, budget, organisation, quality, information and risks): How does operational control of the project take place? The traditional aspects of sound project control play a key role in this process.
- Success criteria (external factors)

Figure 2.3: The project excellence model



(Westerveld, 2003)

In 2008, Kuhang and Moe did a study to explore the success criteria and factors for international development projects (see Table 2.3). The study presented a conceptual model for not-for-profit international projects from a perspective of project life-cycle phases. The empirical data confirm the validity of the model. They argue that little research has been done that pays adequate

attention to the critical success factors of international development projects. The critical success factors that are identified by the study are as follows.

Table 2.4: The success factors for international development projects

Life-cycle phase	Critical success factors
Conceptualising	• Clear understanding of project environment by funding and implementing agencies and consultants • Competencies of project designers • Effective consultations with primary stakeholders
Planning	• Compatibility of development priorities of the key stakeholders • Adequate resources and competencies available to support the project plan • Competencies of project planners • Effective consultation with key stakeholders
Implementing	• Compatible rules and procedures for PM • Continuing supports of stakeholders • Commitment to project goals and objectives • Competencies of project management team • Effective consultation with all stakeholders
Closing/completing	• Adequate provisions for project closing in the project plan • Competencies of project manager • Effective consultation with key stakeholders
Overall project success	• Donor and recipient government have clear policies to sustain project's activities and results • Adequate local capacities are available • There is strong local ownership of the project

(Kuhang & Moe, 2008)

2.4 Project success measurement review

2.4.1 Introduction

The construction industry has a dynamic nature. A construction project is a temporary endeavour with specific uncertainties and risks. Assessment of a project's outcome is extremely important to everyone involved in development projects (Lipovetsky, Tishler, Dvir & Shenhar, 1997, Dvir et al., 2006; Shenhar et al., 2002). Over the years, measuring project success has always been a debatable topic. Time, cost and quality have been defined for very long time as the iron triangle, that is, the basic criteria for measuring project success. However different ideas have also emerged. Although the topic of project success has been investigated for many years, research has not converged to a standard approach (Dvir, Raz & Shenhar, 2003; Ojiako, Johansen & Greenwood, 2008).

2.4.2 The definition of project success criteria

A criterion is defined as standard of judgment or principle by which something is measured (Oxford Dictionary 1990; The Concise English Dictionary, 1990). Lim and Mohamed (1999) define a criterion as a principle or standard by which anything is or can be judged. Chan and Chan (2004) define the criteria of project success as "the set of principles or standards by which favourable outcomes can be completed within a set specification". The criteria for measuring project success must reflect the various views of the different interested groups (stockholders, managers and end-users) (Tishler, et al.,

1996; Dvir et al., 2006; Shenhar et al., 2002). It may not be that difficult to define project success criteria, but “even when everybody agrees with a list of criteria, the measurement of project success remains a rather difficult task” (Diallo & Thuillier, 2004). “It is impossible to generate a universal checklist of criteria suitable for all projects” (Ojiako, Johansen & Greenwood, 2008).

2.4.3 The measures of project success

Over the years, various attempts have been made to explore the issue of measuring project success. However, measuring project success is a complex task, since success is intangible and can hardly be agreed upon. Measuring project success in large-scale studies has proven to be problematic (Larson, 1997). The difficulties in assessing project success have traditionally driven project managers to a simplistic formula (on time, to budget and at required quality) in measuring success (Shenhar & Levy, 1997). Basically, a project is considered to be successful if the building is delivered at the right time, budget, and quality (Chan, Scott & Lam 2002; Belassi &d Tukel 1996; Cooke-Davies, 2002).

Some other academics and practitioners have their own viewpoints on this issue. Project managers and project sponsors often no longer believe in the iron triangle (on time, to budget and at the required quality) (Gardiner and Stewart, 2000). They add more criteria to the traditional iron triangle or create other dimensions to measure project success. The measure of success is multidimensional (Pinto & Slevin, 1988). The internal measures of efficiency (traditional iron triangle) are partial and sometimes misleading; one situation

that cannot be overlooked is when, although a project ran efficiently, it did not meet the customer's needs and requirements (Lipovetsky, Tishler, Dvir & Shenhar,1997; Dvir, Ben-David, Sadeh & Shenhar, 2006).

The opinions of some other researchers are summarised below.

Baker, Murphy and Fisher (1988) point out that a perceived project success not only needs to meet technical specifications and/or project objectives, but also needs to satisfy the following parties:

- the parent company
- the client
- the users or clientele
- the project team itself

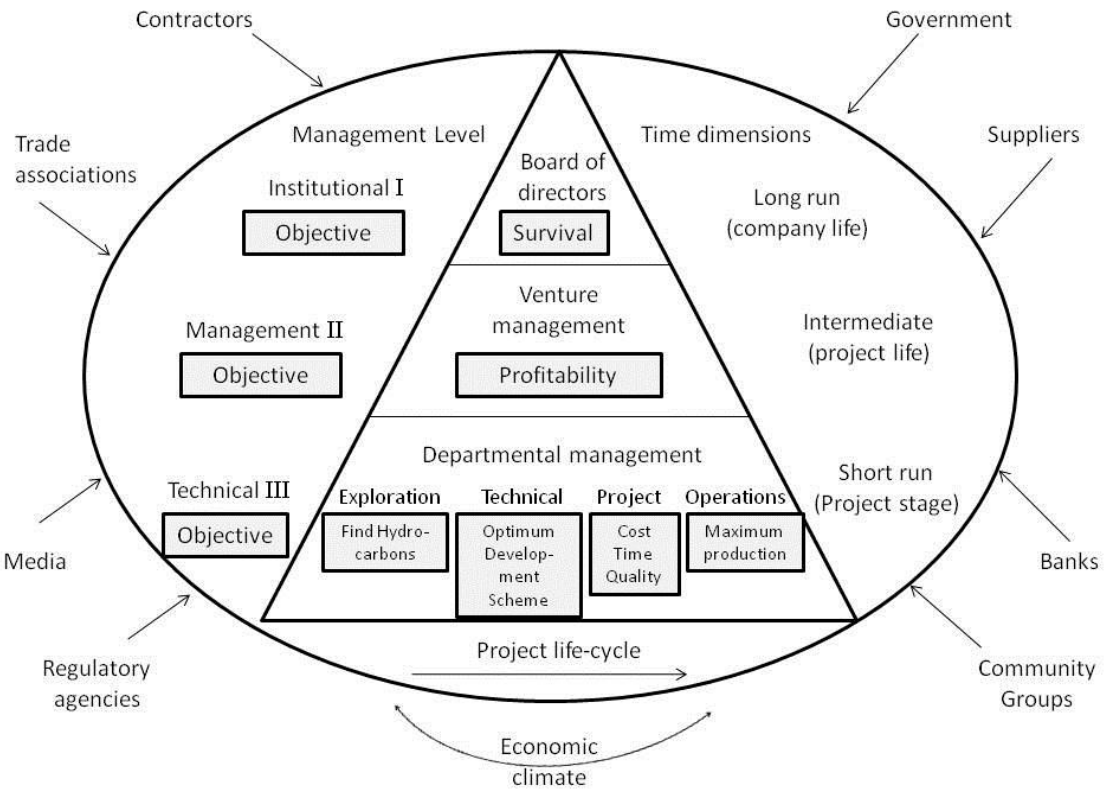
Pinto and Slevin (1988) advocate that the measurement of project success is based on the following characteristics:

- adherence to budget
- adherence to schedule
- level of performance achieved
- organisational validity
- organisational effectiveness

De Wit (1988) states that the most appropriate criteria for success are the project objectives. The success of the project is determined by the degree to

which these objectives have met. The objectives involved in a project are more than just cost, time and quality. A project success framework was developed by De Wit (1988) (see Figure 2.4)

Figure 2.4: Project success framework



(De Wit, 1988)

Pinto and Mantel (1990) identify three aspects of project performance as benchmarks for measuring the success or failure of a project:

- the implementation process itself
- the perceived value of the project
- client's satisfaction with the delivered project

Freeman and Beale (1992) attest that, from a financial perspective, project success can be measured from three viewpoints (sponsor, project manager and sponsor as project manager). They identified seven criteria from measuring project success:

- technical performance
- efficiency of project execution
- managerial and organisational implications
- personal growth
- project termination
- technical innovativeness
- manufacturability and business performance

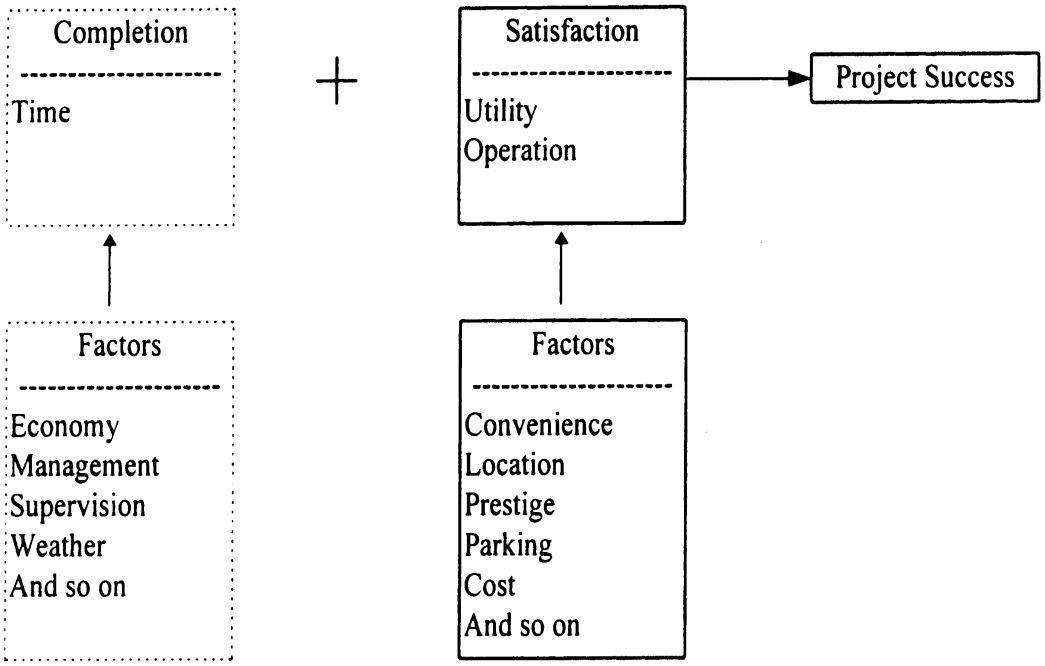
Gardiner and Stewart (2000) contend that the old statement of “on time, to budget and of the required quality” should be re-written to “with the best achievable NPV and to the required quality”. However, they agree with Freeman and Beale that the financial perspective could be a critical measurement for judging project success.

Wateridge (1995) advocated that meeting budget, timescales, user requirements and specifications is a limited criterion because it does not take into account other criteria (for example, quality and achievement of purpose). Project managers should not place too much emphasis on the time and budget aspect when judging project success and should pay more consideration to users’ criteria as measures of success.

Tishler, Dvir, Shenhar and Lipovetsky (1996) found that project managers evaluate project success from four different points of view: (1) from the customer's point of view (including meeting the functional and technical specifications), (2) from an operational point of view (meeting budget and schedule goals), (3) from the degree of the business success of the project, and (4) from the extent to which the project creates new opportunities and provides new technologies for use in future projects.

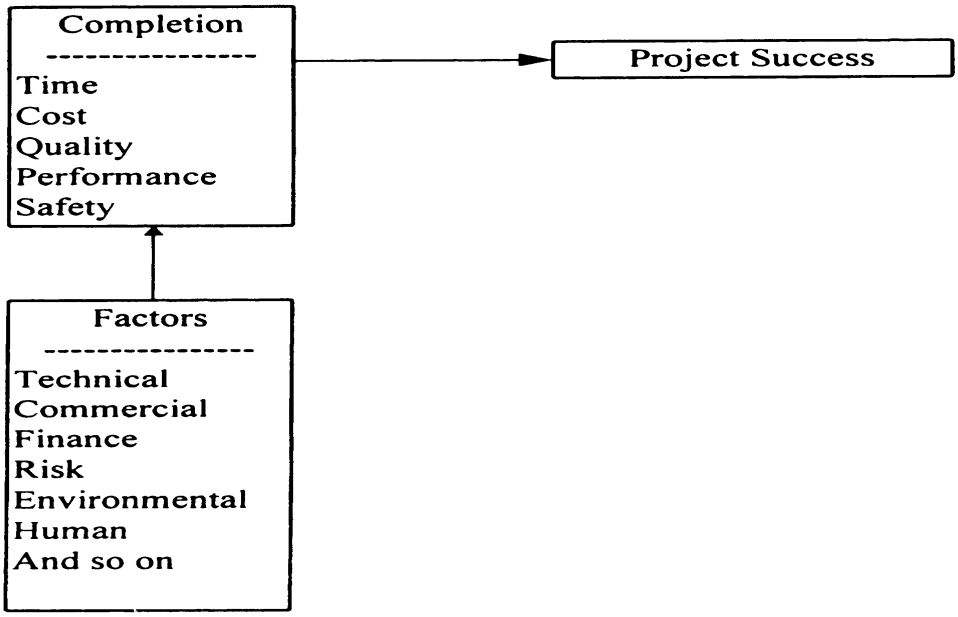
Lim and Mohamed (1999) classify project success into two categories: the macro and micro viewpoints. Users and stakeholders are usually concerned with project success from a macro viewpoint (as indicated for example by their focus on factors such as parking and location Figure 2.5). The construction parties are usually concerned with project success from micro viewpoint (Figure 2.6). These figures also emphasise the background to project success and the role that soft and hard factors play. This is important as context for the model to be proposed later in this research.

Figure 2.5: Macro viewpoint of project success



(Lim & Mohamed 1999)

Figure 2.6: Micro viewpoint of project success



(Lim & Mohamed 1999)

Shenhar，Dvir，Levy and Maltz (2001) as well as Shenhar, Dvir and Levy (1997) identify four success dimensions to measure project success (Table 2.5):

- project efficiency
- impact on the customer
- business success
- preparing for the future

Dvir (2005) stated that “project success was measured along three criteria (two constructs measuring success from two different points of view and an overall success measure) that were validated in previous research by Lipovetsky et al. (1997)”.

- 1. Meeting planning goals (project efficiency).
- 2. Customer benefits (success from the customer’s point of view).
- 3. Overall success (an integrative measure of project success).

These authors state that project managers should not be detached from the organisation’s strategic and long-term goals. Project definition, planning and success assessment should be integrated with the strategic planning and strategic management in organisations (Ojiako, Johansen & Greenwood, 2008).

Table 2.5: Four project success dimensions

Success dimension	Measures
1. Project efficiency	Meeting schedule goal
	Meeting budget goal
2. Impact on the customer	Meeting functional performance
	Meeting technical specifications
	Fulfilling customer needs
	Solving a customer's problem
	The customer is using the product
	Customer satisfaction
3. Business success	Commercial success
	Creating a large market share
4. Preparing for the future	Creating a new market
	Creating a new product line
	Developing a new technology

(Shenhar, Dvir, Levy & Maltz 2001)

White and Fortune (2002) conducted an empirical study aimed at capturing the "real world" experiences of people who are active in project management. They designed a questionnaire that was sent to 995 project managers. The survey achieved a response rate of 23.7%. One of the objectives of the survey was to identify any common criteria used for defining project success criteria. The results of the survey are shown in Table 2.6.

Table 2.6: Criteria used for judging project success

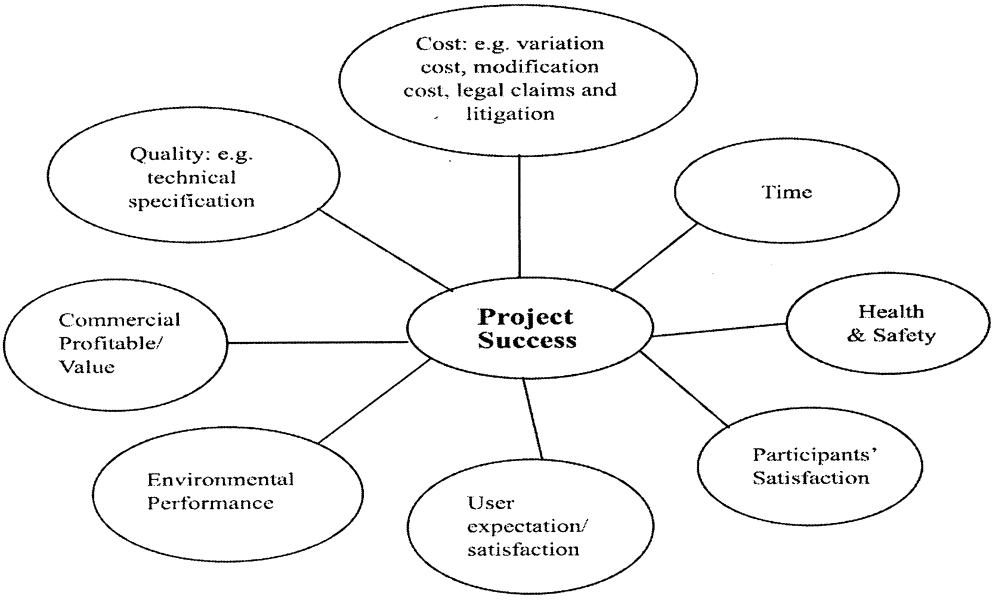
Criteria	Sum of re-coded ranking	Sums ranked
Meets client's requirements	970	1
Completed within schedule	850	2
Completed within budget	766	3
Meets organisational objectives	188	4
Yields business and other benefits	86	5
Causes minimal business disruption	71	6
Meets quality/safety standards	48	7
Other criteria	20	8

(White & Fortune, 2002)

From the survey results, we can see that "Meets client's requirements" is the criterion most often ranked first by the respondents, followed by "Completed within schedule" and "Completed within budget".

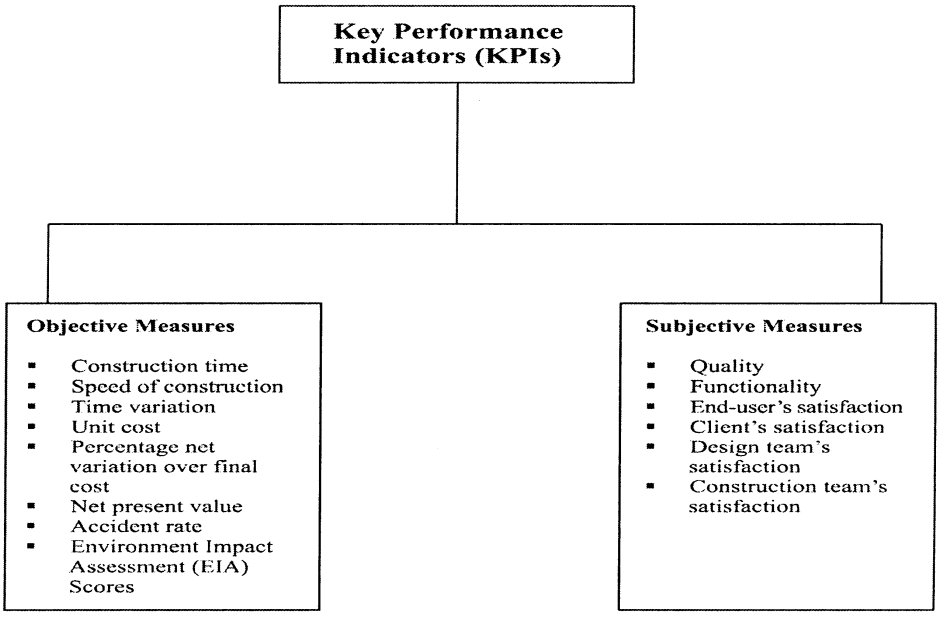
Chan and Chan (2004) undertook a comprehensive review of the literature on the measurement of project success in the1990s. They found that researchers proposed different criteria during the 1990s for measuring project success. Chan and Chan (2004) proposed a consolidated framework for measuring the success of construction projects (Figure 2.7) and advocated the use of KPIs (Key Performance Indicators) to measure the performance of a construction project (Figure 2.8).

Figure 2.7: The consolidated framework for measuring project success



(Chan & Chan, 2004)

Figure 2.8: KPIs for construction project success



(Chan & Chan, 2004)

Yu, Flett and Bowers (2005) propose a project-orientated and value-centred scheme for assessing project success. They identify two approaches addressing the inadequacies of the traditional criteria of the iron triangle (cost, time and quality). Their article defines two key concepts: the net project execution cost (NPEC) and the net project operation value (NPOV). Twelve possible project outcomes are outlined, based on the values of NPEC and NPOV at project completion compared to their initial estimates.

NPEC is defined as the net of all costs borne by the client minus all the benefits accrued to the client during project execution ($NPEC=C_{project}-B_{project}$).

The NPOV is defined to capture all the benefits a client derives from the created product during product operation minus any associated operational cost($NPOV=B_{operation}-C_{operation}$).

Diallo and Thuillier (2004) agree that success is only perceived success. They believe that success can be measured only when the evaluation dimensions are adequately defined. They propose the following list of evaluation dimensions:

- respect of the three traditional constraints
- satisfaction of the client
- satisfaction of the objectives as outlined in the logical framework
- project impact
- institutional or organisational capacity built in the organisation by the project
- financial returns (in the case of productive projects) or economic or social benefits (in the case of public sector projects)

- project innovative features (outputs, management or design)

Millis and Vanhoof did a study to evaluate the success of ICT projects in 2007 and the results showed that the iron triangle did not guarantee the success of the project. Other criteria such as user happiness and financial and commercial success should be incorporated into the set of criteria to evaluate the success of ICT projects.

Ojiako, Johansen and Greenwood (2008) argue that there is no universal checklist of criteria for all projects. Success criteria will differ from project variables such as size, uniqueness, industry, complexity and the stakeholders involved. The cost, time and quality criteria need to be established in the context of “project performance”.

2.4.4 The findings from the literature review

The literature review presented in the previous subsections is placed in context in this section. This exploratory research in the literature review found that there does not appear to be consensus among researchers and practitioners on the criteria for measuring project success (Wateridge, 1995). There exists a general disagreement on order of importance of measures of success (Bryde & Robinson, 2005). Success can indeed be evaluated only when the evaluation dimensions are adequately defined. There is no “absolute” success or consistency in overall success over time (Diallo & Thuillier, 2004).

The measurement of project success is ambiguous and there does not seem to be consensus on many aspects (Dvir, Raz & Shenhar, 2003; Yu, Flett & Bowers, 2005; Westerveld, 2003). One group of researchers has tried to add more dimensions to the iron triangle in order to complement its inadequacies. Those researchers created new dimensions to describe the meaning of project success in their respective ways (Pinto & Slevin, 1988; Baker, Murphy & Fisher, 1988; De Wit, 1988; Freeman & Beale, 1992; Shenhar，Dvir，Levy & Maltz, 2001; Chan & Chan, 2004; Milis & Vanhoof 2007; Ojiako, Johansen & Greenwood, 2008). The measurement of project success is continuously enriched as time passes.

Many academics and practitioners believe that measuring project success is perceived and sometimes subjective. The project success criteria vary, depending on the point of view, from project to project, and even from point of time to point of time. There is no “absolute” project success. One must define the criteria of project success prior to measuring it **(**Pariff & Sanvido,1993; Diallo & Thuillier, 2004; Baker, Murphy & Fisher, 1988; Freeman & Beale, 1992; Lipovetsky, Tishler, Dvir & Shenhar, 1997; Lim & Mohamed, 1999; Bryde & Robinson, 2005; Shenhar & Levy, 1997; Chan, Scott & Lam, 2002; Muller & Turner, 2007; Ojiako; Thomas & Fernandez,2008) **.**

Measuring project success should link organisational strategic management, strategic planning and long-term goals (Shenhar，Dvir，Levy & Maltz ,2001; Diallo & Thuillier, 2004; Shenhar，Dvir，Levy & Maltz, 2001; Shenhar & Levy, 1997; Milis & Vanhoof 2007; Ojiako, Johansen & Greenwood,2008,Lechler &

Dvir, 2010). Shenhar (2001) also argues that time is of relative importance for success factors.

Some project success criteria are “hard” (objectives), tangible and measurable. These normally refer to time, cost and quality. Other “soft” success criteria are subjective, subtle and more difficult to measure, such as satisfaction, user happiness, financial/commercial success, enhanced reputation and attention to detail (Baccarini, 1999; Milis & Vanhoof, 2007).

The measurement of progress of time, cost and quality is no doubt an essential part of measuring project success (De Wit, 1988; Atkinson, 1999). These three criteria (on time, to budget, to specification) were the highest ranked success criteria identified by project managers (White & Fortune, 2002). Budget, schedule and quality are the three generally accepted criteria and the most important performance indicators to achieve the objectives of a construction project (Chan, Scott & Lam, 2002; Chan & Chan, 2004; Ojiako, Johansen & Greenwood, 2008).

2.5 Summary

This chapter assessed some of the key concepts that are relevant to projects and project management, and compared aspects such as projects and products. The context of international projects as well as international project teams and foreign business environment were also described. Project success and project success measurement are a critical issue that must be interpreted before further research can be conducted. A detailed literature review on project success and project success measurement was conducted in this

chapter. The existing literature showed that, although measuring project success is an intangible and sometimes subjective endeavour, the iron triangle (time, cost, quality) appears to contain the essential elements for measuring project success.

Several peer reviewed international conference papers have been published by the author of this thesis (Jiang and Pretorius 2008, 2009, 2010) based partially on the contents of the following chapters.