

Project Management Competence for the Next Century

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Introduction

As we move into the twenty-first century, project management, as the management of change, is emerging as the primary management paradigm for the future. Already, a project management approach is being adopted in organizations outside such traditional project-based industries of engineering, construction, and defense procurement (Stewart 1995). At the same time there is a growing recognition that the nature of projects and, therefore, project management is changing. Projects are becoming increasingly complex and multi-disciplinary with recognition of a wider range of stakeholders than in the past. As the distinctions between disciplines become blurred, discipline-based approaches to project management such as those followed in engineering and construction do not always provide the recipe for success.

Organizations are looking for new and more reliable guideposts than they have had in the past to help them identify and develop project personnel who are able to meet these challenges as they approach the next century. There is growing interest in project management competence arising from:

- a need for project personnel with the competence to manage different types of projects in rapidly changing project environments
- an increasing demand for competent project personnel as project management is adopted by organizations outside traditional areas, and more and more business activities are defined as projects
- a need for more effective ways of selecting project personnel and of recognizing and developing project management competence.

In response to these demands on industry and on the project management profession, the Australian government and industry are funding a major project management competency research project, which is being undertaken in collaboration with the University of Technology, Sydney, the Australian Institute of Project Management, and industry partners. The Project Management Institute (PMI), the International Project Management Association (IPMA), the Association for Project Management (APM), and international industry partners have been invited to join the project as international partners.

Aims of the project are:

- to identify competency profiles of effective project personnel for a range of application areas and project environments
- to design and validate a model for assessment and development of project management competence.

This paper describes the project management competence research project, the progress achieved to date, and the contribution that the research outcomes will make to project management in the next century.

Background

In May 1996 the University of Technology, Sydney (UTS), and the Australian Graduate School of Engineering Innovation (AGSEI), in partnership with the Australian Institute of Project Management (AIPM) and other industry partners, lodged a collaborative grant application with the Australian Research Council, Australia's peak research funding body. The application was successful, and the project commenced in February 1997. A senior research officer was appointed in April 1997.

The title of the research project is *Developmental Assessment of Project Management Competence*. The purpose of the project is: *to develop profiles of underlying knowledge, attitudes, and behaviors which lead to high performance in a range of project management roles and to provide a framework for both attribute and performance-based competency assessment and development, job design and selection of project personnel for improved project performance.*

The success of the grant application can be seen as recognition, by a national government, of the importance of project management, and, as such, is a significant achievement for the project management profession internationally.

The initial research funding covered the conduct of the research project in Australia. The researchers and industry partners recognized the contribution the project could make in establishing a sound research base for development of global project management standards, if conducted internationally. To facilitate this, project management professional organizations and corporations, worldwide, were invited to participate in the project. Response was extremely positive, and arrangements have now been made to collect data on project

Exhibit 1. Relationship between Project Management Competence and Organizational Performance

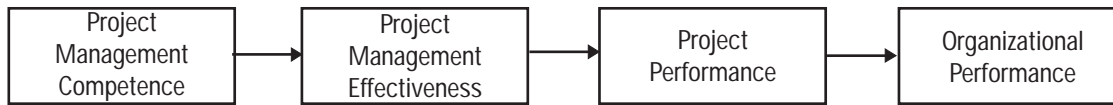


Exhibit 2. Focus of This Research Project



personnel in Australia, the United States, Canada, the European Union, Asia, South Africa, and Latin America.

Project Management Competence

Professional organizations (AIPM (sponsor) 1996; PMI 1996; APM 1993) and various commercial organizations (i.e., Digital, Texas Instruments, Natwest) have attempted to identify the skills, knowledge, and behaviors that they believe a competent project manager should possess. Writers and researchers (Thamhain and Wilemon 1977; Posner 1987; Gadeken and Cullen 1990; Gadeken 1991; Price 1994; Petersen 1991; McVeigh 1995) have endeavored to identify aspects of competence that are characteristic of effective or high performing project managers.

Interest in project management competence stems from the very reasonable and widely held assumption that if people who manage and work on projects are competent, they will perform effectively and that this will lead to successful projects and successful organizations (Karpin 1995; Beer, Eisenstat et al. 1990; Smith, Carson et al. 1984).

The concern of this research project is the relationship between project management competence and project management effectiveness as a basis for developing competency profiles of effective project personnel in a range of project environments.

To investigate this relationship it is necessary to establish measures of both project management competence and project management effectiveness.

Competence is a term which is widely used but which has come to mean different things to different people. It is generally accepted, however, as encompassing knowledge, skills, attitudes, and behaviors that are causally related to superior job performance (Boyatzis 1982). This understanding of

competence has been described as attribute-based inference of competence (Heywood et al. 1992). To this can be added what is referred to as a performance-based approach to competence, which assumes that competence can be inferred from demonstrated performance at pre-defined acceptable standards in the workplace (Gonczi et al. 1993). The performance-based approach is the basis for what has become known as the competency standards movement that underpins the National Vocational Qualifications in the United Kingdom and the Australian Competency Standards Framework.

Australia's Competency Standards for Project Management were developed over a three-year period, from 1993 to 1996, in association with industry, under the sponsorship of the Australian Institute of Project Management and with funds provided by both government and industry. They are endorsed by the Australian government as part of what is now known as the Australian Qualifications Framework. As the first government-endorsed performance-based competency standards for project management, the Australian National Competency Standards for Project Management (1996) may be considered as a de facto international standard for what project managers are expected to be able to do.

PMI's *A Guide to the Project Management Body of Knowledge (PMBOK Guide)* (1996) can be considered as a de facto international standard for what project personnel can be expected to *know*.

For the purposes of the research project being described here, instruments have been developed to provide measures of project management competence, which encompass both attribute and performance-based approaches. This has been further broken down into a framework of input, process, and output competencies (Finn 1993), where competence is considered as a combination of:

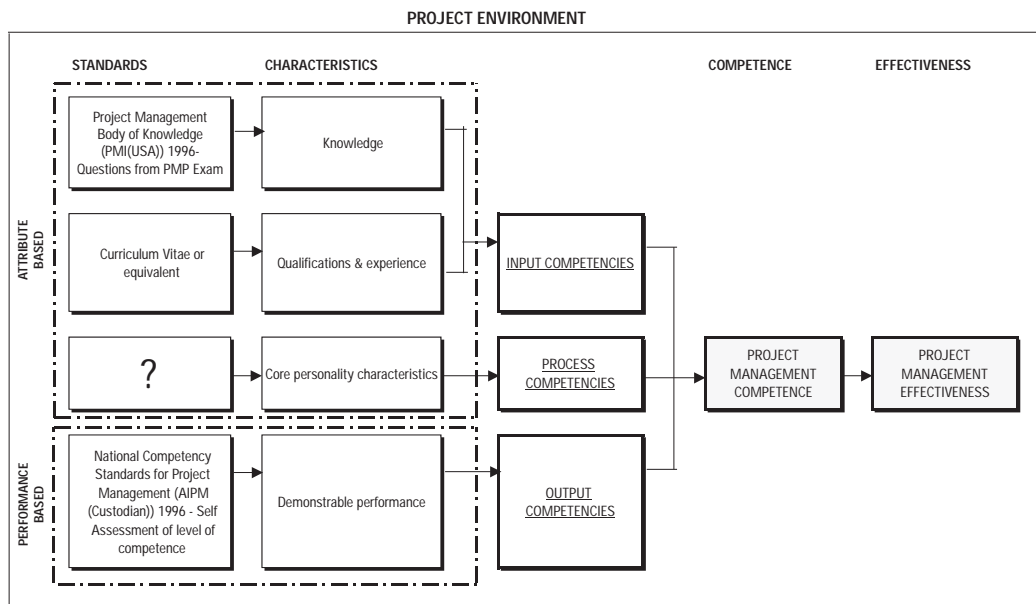
This understanding of the dimensions of competence has been translated into the following integrated model of project management competence:

Based on this model, the following instruments have been developed:

Exhibit 3. Dimensions of Competence

<p>Knowledge (qualifications) + Skills </p> <p>+</p>	<p>Input Competencies:</p> <p>+</p>	<p>the knowledge and understanding, skills and abilities that a person brings to a job</p>
<p>Core Personality Characteristics (Motives + Traits + Self-Concept) </p> <p>+</p>	<p>Process Competencies:</p> <p>+</p>	<p>the core personality characteristics underlying a persons capability to do a job</p>
<p>Demonstrable performance in accordance with occupational / professional / organizational Competency Standards. </p>	<p>Output Competencies:</p>	<p>the ability to perform the activities within an occupational area to the levels of performance expected in employment</p>

Exhibit 4. An Integrated Model of Project Management Competence



1. Project Management Competence

1.1 Project Management Knowledge:

A test, using PMI's *PMBOK Guide* as the knowledge standard. The test is based on PMI's project management professional (PMP) exam and is intended to identify the extent of a person's knowledge of formal project management processes and terminology.

1.2 Qualifications and Experience:

A questionnaire, based on the qualifications and experience questionnaire used by PMI as part of qualification for the PMP award. Sections on non-project management experience and service have been added.

1.3 Personality Tests:

Two personality tests will be used to identify core personality characteristics, which can be causally related to effective

project management performance. The two tests to be used are:

- 16 PF: a personality questionnaire that measures sixteen primary aspects of adult personality .
- Caliper Profile: initially known as the Multiple Personal Inventory (MPI), is an instrument which has been specifically developed to predict successful performance in a number of job roles (Greenberg and Greenberg 1980).

1.4 Performance-Based Competence:

Self assessment against Australian National Competency Standards for Project Management.

2. Project Environment:

A questionnaire, which establishes the nature of the project environment in which the person normally operates, including such factors as:

- Job title
- Project size and duration
- Number of projects
- Project complexity
- Application area (industry).

3. Project Management Effectiveness:

Supervisor and self rating on a number of dimensions including:

- Value to the client
- Value to the organization
- Effectiveness of relationship with peers in achieving project goals
- Ability to inspire and encourage the performance of others
- Frequency with which the person completes projects on time, within budget, and achieving project goals
- Use of recognized project management methodologies
- A number of behavioral characteristics which have been validated as causally related to superior performance.

Instruments which have been developed for this project (Items 1.1, 1.2, 1.3, 1.4, 2, and 3) have been tested in pilot studies conducted in Australia, the United States, the United Kingdom, and South Africa, and modifications have been made in response to this feedback. The full process, which takes eight hours, including the two personality tests, has also been piloted, in both the United States and Australia. The data collection process is conducted as three hours of pre-work, followed by a half-day workshop conducted in a location to suit the participating organizations.

Sample

Organizations are asked to nominate a minimum of five and a maximum of twenty project personnel according to the industry/application area indicated in Exhibit 5. The minimum of five is intended to allow smaller organizations or project management functions in larger organizations to contribute to the project. The upper limit of twenty is to ensure that one organization does not dominate the sample in a particular project industry/application area category. Multi-functional organizations will be offered the opportunity for participation of separate sample groups from distinctly different parts of their organizations, which would fall into different project industry/application areas.

Arrangements have been made to collect data from project personnel in Australia, the United States, Canada, the European Union, South Africa, Latin America, and Asia. The intended minimum sample, per country, is as follows:

Feedback and Benefits for Participants

Project Personnel

All project personnel who participate in the project will receive a copy of their own project management competency profile, against each of the nine units of the *PMBOK Guide* and the Australian National Competency Standards for Project Management. This will be shown in relation to the average competency profile for their organizational group. The individual competency profiles will be entirely confidential and will NOT be provided to the employing organization.

This feedback will be of value to individual participants by indicating those areas of project management in which they need to develop their competence. This may suggest that they should negotiate with their employing organizations for opportunities for experience as well as training in particular aspects of project management. For those considering applying for certification or registration under the PMP program, the Australian National Competency Standards for Project Management, or other national schemes, the feedback will give them an indication of how successful they are likely to be and whether they may need more experience or training before applying.

Participating Organizations

Participating organizations will receive the average competency profile for their set of project personnel. As the project data builds, they will receive bulletins that indicate their organizational average competency profile in relation to the:

- Average competency profile for the whole sample
- Average competency profile for each country sample

Exhibit 5. Proposed Sample Composition Per Country

Industry Sector / Application Area	No of organizations	No of personnel
Aerospace & Defense	2 to 4	30
Construction, mining, petroleum	2 to 4	30
Financial services, banking, insurance (incl. management consulting)	2 to 4	30
Government (n.e.c.)	2 to 4	30
Information Systems and Management (including IT and telecommunications)	2 to 4	30
Manufacturing (incl. automotive, pharmaceutical, & new product development)	2 to 4	30
Utilities (inc. transportation and environmental management)	2 to 4	30
TOTAL	14 to 28	210

- Average competency profile for their industry sector/application area.

The average competency profile for each organization will be confidential to that organization and will not be released to other organizations other than as part of the averages for the whole sample, each country, and each industry sector/application area.

This information will be particularly useful to organizations in:

- Benchmarking the competence of their project personnel
- Benchmarking their organizational project management competence by identifying any project management practices which are not generally followed within the organization
- Providing guidance for project management training and development of project management systems.

The feedback information from the research will assist organizations and individuals in preparing for the next century.

Data Analysis and Dissemination of Results

Multivariate data analysis will be used to test a number of hypotheses, the key being that statistically significant profiles of input, process, and output competencies can be developed

that differentiate the most effective from the least effective project personnel across application areas and project environments.

Results will be disseminated to the research partners and participating organizations in bulletins issued at three to six month intervals commencing in late 1997. These will continue to be issued for the duration of the project, which is funded until the end of 1999. Results will be made available to participating project management professional organizations (AIPM, PMI, IPMA, APM) and through these organizations to their members.

Use for Research Results

Proposed deliverables from this research project are:

1. Competency profiles of effective project personnel in a range of project environments
2. Performance appraisal process for project management personnel
3. Assessment centers for project management personnel
4. Job design for effective project performance.

It is envisaged that the results of this research will provide assistance:

5. To project management professional associations in developing and maintaining the currency of registration/certification of individuals and in accreditation of project management education and training courses
6. To organizations in assessing and enhancing their project management systems and competence of their project personnel
7. To individuals in providing guidance for self development.

It will also provide a basis for review of both the PMI's *PMBOK Guide* and the Australian National Competency Standards for Project Management to ensure that they correctly reflect what effective project managers need to know and do.

An important aspect of the project is that it will provide research-based guidance as to those core personality characteristics that can be demonstrated to relate to effective project performance in a range of project environments.

Project Management Competence for the Next Century

With funding carrying it through to February 2000, this research project is perfectly timed to assist the project management profession in preparing for the next century. With the support of project management professional organizations and industry, worldwide, it is well placed to make a significant contribution to the development of project management standards that will meet the needs of the global project management community of the twenty-first century.

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