IT project managers’ construction of successful project management practice: a repertory grid investigation

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Abstract. Although effective project management is critical to the success of information technology (IT) projects, little empirical research has investigated skill requirements for IT project managers (PMs). This study addressed this gap by asking 19 practicing IT PMs to describe the skills that successful IT PMs exhibit. A semi-structured interview method known as the repertory grid (RepGrid) technique was used to elicit these skills. Nine skill categories emerged: client management, communication, general management, leadership, personal integrity, planning and control, problem solving, systems development and team development. Our study complements existing research by providing a richer understanding of several skills that were narrowly defined (client management, planning and control, and problem solving) and by introducing two new skill categories that had not been previously discussed (personal integrity and team development). Analysis of the individual RepGrids revealed four distinct ways in which study participants combined skill categories to form archetypes of effective IT PMs. We describe these four IT PM archetypes – General Manager, Problem Solver, Client Representative and Balanced Manager – and discuss how this knowledge can be useful for practitioners, researchers and educators. The paper concludes with suggestions for future research.

Keywords: IT project management, repertory grid, project management skills, project manager skills

INTRODUCTION

Successful project management skills are needed to combat the trend of failing Information Technology (IT) projects. The Standish Group International (2004) reports that 53% of all IT
projects are late and/or over budget; an additional 18% either fail outright or are cancelled prior to completion. An international study found that US and Finnish project managers (PMs) listed ‘lack of effective project management skills’ among the top five risk factors for software projects (Schmidt et al., 2001). In a survey of 42 software projects, Verner & Evanco (2005) found a significant, positive relationship between project success and the IT PM’s ability to understand customer problems, articulate a clear vision, communicate well with employees, control the project and reward the staff.

Although the Project Management Institute (PMI) has created training and certification programs for PMs, these offerings only address generic PM skills. There is some evidence that the skill set of successful IT PMs may be unique (Vaas, 2002). An exploratory study by Wirth (1996) found that information systems projects have higher levels of uncertainty than projects from the construction, utilities, pharmaceutical, or manufacturing industries. Despite these industry-specific differences, little empirical research has been conducted to investigate skill requirements for successful IT project management. This research addresses this gap in the literature by examining the following research questions:

1 What do IT PMs construe as skills necessary for successful project management practice?
2 How do IT PMs group these skills to reflect successful project management practice?

To answer these questions, we conducted in-depth interviews with 19 experienced IT PMs using the repertory grid (RepGrid) technique. We asked each of them to compare and contrast the skills of six IT PMs they had personally worked with as well as the archetypical ‘Ideal’ and ‘Incompetent’ PM. The objective of the research was to understand the perceptions of IT PMs concerning their own practice. To that end, we first identified relevant emerging skill categories that characterized the ideal IT PM. We then analyzed individual responses to form IT PM archetypes that describe the combinations of these skill categories that are associated with successful project management practice. Rather than being constrained or biased in any way by existing skills lists within the project management literature, our research design allowed these characteristics to emerge from the IT PMs themselves.

The remainder of this paper is organized as follows. First, we motivate the need for this study by evaluating prior research on skills in general and IT PM skills in particular. Then, we discuss the research design and methodology. Next, we present key findings: a description of the emerging skill categories, a comparison of these skills with the prior literature and the IT PM archetypes. We conclude with implications for practice and research.

BACKGROUND

Skilful practice and skills-as-attributes

The PMI’s Project Management Competency Development (PMCD) framework conceptualizes PM competency as consisting of three components: a performance component representing things that the PM actually knows how to do; a knowledge component representing explicit
knowledge about project management tools and techniques; and a personal component representing personal attributes and characteristics (PMI, 2002). Similarly, Crawford (2005) has developed an integrated model of project management competency that acknowledges two ways of inferring competency: performance based and attribute based.\(^1\) The attribute-based portion of this model encompasses the PMCD’s knowledge and personal components.

Performance-based competency focuses on skilful practice: the ability of the PM to demonstrate project management ‘know-how’. In the skilful practice view, competent PMs can be identified through effective actions that lead to successful projects. This view of competency is consistent with the epistemology of practice that focuses on ‘work that is done as part of action or practice’ (Cook & Brown, 1999, p. 387).

Attribute-based competency focuses on skills-as-attributes: the extent to which the PM has acquired the necessary set of knowledge and personal characteristics. In the skills-as-attributes perspective, competent PMs can be identified through their ‘know-what’, such as their mastery of project management concepts in the ‘Project Management Body of Knowledge (PMBOK® Guide)’ (PMJ, 2004). This view aligns with Cook & Brown’s (1999) epistemology of possession.

This distinction between skilful practice and skills-as-attributes has implications for how research into PM competency is conducted. The skilful practice perspective gives priority to the behaviours and actions undertaken by successful PMs. Researchers adopting this perspective would be interested in observing the activities and interactions of successful PMs, tracking changes to these work practices over time, and measuring the relationship between PM actions and project performance. An appropriate research methodology for understanding this would be work studies capturing the actual daily activities of successful PMs (Barley & Kunda, 2001).

The skills-as-attributes perspective gives priority to explicating the requisite knowledge and skills competent that PMs should acquire. Researchers adopting this perspective would be interested in topics such as predicting and prioritizing required skills based upon contextual factors, tracking changes to these skills over time, and measuring the relationship between skill sets and project performance. These skills could be identified through a variety of methods, including asking key stakeholders directly for their perceptions of important skills (e.g. Hunter & Beck, 2000).

Although acknowledging that both perspectives can contribute to research, for the purposes of this study, we have chosen to adopt the perspective of skills-as-attributes when investigating IT PM competency. Our intent is to provide relevant insights into what IT PMs consider as skills necessary for successful IT PM practice.

**Perceived skills for successful IT practice**

Skill requirements research empirically investigates the relative importance of specific skills for IT professionals. For example, several studies have examined the importance of technical vs.

\(^1\)We would like to thank the anonymous reviewer for bringing this distinction to our attention.
Once salient skills for successful IT practice have been identified, we can examine the extent to which individuals possess these skills. Skill deficiency measures the gap between a job’s skill requirements and a person’s proficiency with that skill (Nelson, 1991). After becoming aware of this deficiency, individuals may engage in professional development programmes and career training to increase their capabilities. Similarly, educational institutions that perceive a gap in their graduates’ skills may redesign the curriculum (Trauth et al., 1993). Furthermore, periodically measuring skill requirements over time helps identify historical trends and provides insight into future skill needs.

Our research falls within the tradition of other studies of skill requirements for different types of IT professionals (Nakayama & Sutcliffe, 2001) including chief information officers (Brown, 1993; Smaltz et al., 2006), systems analysts (McCubbray & Scudder, 1988; Hunter, 1993) and IS managers (Gramignoli et al., 1999). These studies have used a variety of approaches to understand the skill requirements of various IT positions. For example, content analysis has been used to examine desired skills listed in job advertisements (e.g. Todd et al., 1995; Gallivan et al., 2004). Surveys have been distributed that ask participants to assess the importance of a particular skill using a Likert scale or prioritized ranking (e.g. Green, 1989; Jiang et al., 1998). Yet others have conducted interviews directly with various stakeholders on the most important skills for a particular IT position. For instance, when examining skill requirements for systems analysts, Hunter & Beck (2000) interviewed individuals from five stakeholder groups: peers, business systems managers, users, sponsors and clients.

A common feature of these studies is that they collect and value the subjective perceptions that key stakeholder groups have about skill requirements. The judgements of practicing IT PMs would prove useful in developing a lay theory (Cammock et al., 1995) regarding skill requirements for effective IT PM practice. However, there are other reasons for finding perceptions to be valuable; in short, individual perceptions influence behaviour. For example, consistent with discrepancy theory, Tesch et al. (2003) found that IT specialists experienced greater career satisfaction when their perceived skill proficiency exceeded their expectations of required skills for the job. Understanding perceived IT skill sets may therefore help us to understand career satisfaction. Leadership categorization theory (Lord & Maher, 1991) provides another example of the importance of perceptions. This theory measures two beliefs: (1) the individual’s concept of ideal leadership (e.g. autocratic, decisive) and (2) the individual’s perception of how well a potential leader matches this ideal (e.g. democratic, consensus-building). A match between the ideal and perceived concepts suggests that the individual is more likely to follow the leader. This may be helpful in explaining, for instance, cross-cultural differences in managerial effectiveness (Hunter & Beck, 2000). These examples indicate that IT skills research can benefit from studying the perceptions of stakeholder groups.

In this exploratory study, we examine IT PM’s construction of successful IT project management practice. We understand that these skills are socially constructed and influenced by the context in which these IT PMs operate. Therefore, we accept that there will be a variety of
construct systems and patterns that IT PMs think of as important skills. However, understanding these viewpoints can be an important foundation for further theorizing and deepening our understanding of successful IT PM practice.

**IT PM skill literature**

To determine what prior researchers had learned about IT PM skills, we systematically searched the literature for relevant articles published through July 2005. The key phrases used in the search included ‘project management skill’, ‘project management competency’, ‘project manager skill’ and ‘project manager competency’. Articles were considered relevant to our study if they described an empirically based study and if they sought to determine relevant skills for IT PMs. Studies that focused on the skills of IT professionals as a larger group (Lee et al., 1995) or another specialty field within IT such as systems analysts (McCubbray & Scudder, 1988; Green, 1989) and computer programmers (Bailey & Stefaniak, 2001) were intentionally excluded from further consideration. We gathered an initial pool of potentially relevant articles and examined their references to identify additional articles (Webster & Watson, 2002).

El-Sabaa’s (2001) and Jiang et al.’s (1998) articles were the only ones that reported studying IT PMs. El-Sabaa’s (2001) study contained two parts. First, he interviewed 85 PMs from the information systems, electricity and agricultural sectors in Egypt regarding the most desirable traits of PMs. He then used results obtained from the first phase to generate a questionnaire that listed skills. This questionnaire was completed by 126 PMs from the same three sectors. El-Sabaa chose to report his ranked list of skills using all the responses together. Because he did not separate the information systems PMs, it is difficult to apply his findings to our first research question regarding IT PMs.

Jiang et al.’s (1998) study is the only one that specifically examined IT PM skills. Questionnaires were distributed to 118 Information Systems PMs from six large organizations in North America (Jiang et al., 1998). The questionnaire items were based upon an earlier study by Green (1989) that examined necessary skills for systems analysts. The respondents were asked to rank the importance of each of these skills. The group ranked the top skills to be interviewing, directing and managing. The next most important group of skills was related to communications (speaking, listening and writing) followed by interpersonal skills (cooperation, patience, sensitivity and diplomacy). Of least importance were the skills of sales, assertiveness and non-verbal communication. While Jiang et al. did examine IT PMs, their study suffers from a key limitation that suggests that further research is warranted. This limitation involves construct validity or ‘the extent to which a given test/instrumentation is an effective measure of a theoretical construct’ (Straub et al., 2004). The questionnaire items used by Jiang et al. (1998) were originally created to examine the skills needed for systems analysts. Thus, it is possible that important skills for IT PMs were not captured by the instrument, and therefore unavailable to be ranked. To address this issue in our research, we purposely adopted an open-ended interview approach that allowed the most relevant skills to emerge from the IT PMs themselves.
RESEARCH DESIGN

Our research design involved three activities as summarized in Figure 1. First, we used the RepGrid technique to interview participants. Next, we conducted a sorting exercise to reduce the 147 elicited raw constructs into nine skill categories. Finally, we used pattern-matching and clustering techniques to distinguish patterns in the data across individual grids, resulting in four IT PM archetypes. Each of these steps is explained more fully in the succeeding sections.

Step 1: interview participants

The RepGrid is one in a family of cognitive mapping tools (Eden, 1992; Eden et al., 1992). It has been widely used in organizational and IS research. Selected application in organizational studies include organizational design (Wacker, 1981), organizational dynamics (Dunn & Ginsberg, 1986), problem construction (Eden & Jones, 1984), strategic groups (Reger & Huff, 1993) and managerial competencies (Cammock et al., 1995). In IS, the technique has been used in developing expert systems (Phythian & King, 1992), modelling knowledge (Latta & Swigger, 1992), assessing IS project risk factors (Moynihan, 1996), exploring what makes excellent systems analysts (Hunter, 1997), and more recently, examining business and IT thinking (Tan & Gallupe, 2006). An elaborate discussion of the relevance of RepGrid to IS research and practice can be found in Tan & Hunter (2002).

RepGrid is the methodological extension of Kelly’s (1955) Personal Construct Theory. Kelly argued that individuals look at the world through their own personal constructs and that these constructs are influenced by their background, personal experiences, belief and value.

![Figure 1. Research design summary.](Figure 1. Research design summary.)
systems. The RepGrid requires participants to identify constructs that differentiate a set of elements. Elements are the object of the study and constructs are the qualities used to differentiate elements. Constructs are bipolar in nature, e.g. ‘calm, level-headed – emotional.’ To understand the underlying meaning of each elicited construct, a process known as ‘laddering’ is employed, in which a series of ‘how’ and ‘why’ questions are used to encourage participants to elaborate on the meaning underlying the construct labels used. Detailed comments recorded on the constructs and their underlying meaning provide descriptive support and are subsequently analyzed to identify emerging themes.

The IT PMs who participated were a convenience sample based upon personal and professional contacts of the researchers (see Table 1). We interviewed 8 women and 11 men who had at least 3 years of experience in project management (average = 9 years). Participants were drawn from various companies and most worked in the telecommunications and information services industries. More than a third of the participants held master’s degrees. Pseudonyms have been used to protect the privacy of the individuals.

Each interview lasted for approximately 60 minutes. When given permission by the IT PM, the interviews were recorded and later transcribed. In all cases, detailed notes of the discussion were taken and the participant’s verification that the RepGrid (described in succeeding discussions) accurately captured the participant’s meanings was obtained. Figure 2 provides an overview of the steps conducted during the interview.

<table>
<thead>
<tr>
<th>Pseudonym</th>
<th>Gender</th>
<th>IT PM experience (years)</th>
<th>Industry of most recent employer</th>
<th>Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patty</td>
<td>Female</td>
<td>10</td>
<td>Telecommunications</td>
<td>MS</td>
</tr>
<tr>
<td>Sean</td>
<td>Male</td>
<td>7</td>
<td>E-commerce</td>
<td>MS</td>
</tr>
<tr>
<td>Glenda</td>
<td>Female</td>
<td>10</td>
<td>Telecommunications</td>
<td>MS</td>
</tr>
<tr>
<td>Edward</td>
<td>Male</td>
<td>12</td>
<td>Telecommunications</td>
<td>High School</td>
</tr>
<tr>
<td>Laura</td>
<td>Female</td>
<td>12</td>
<td>Telecommunications</td>
<td>BS</td>
</tr>
<tr>
<td>Jennifer</td>
<td>Female</td>
<td>8</td>
<td>Telecommunications</td>
<td>High School</td>
</tr>
<tr>
<td>Mitch</td>
<td>Male</td>
<td>5</td>
<td>Telecommunications</td>
<td>BS</td>
</tr>
<tr>
<td>Paul</td>
<td>Male</td>
<td>15</td>
<td>Telecommunications</td>
<td>BS</td>
</tr>
<tr>
<td>Wayne</td>
<td>Male</td>
<td>5</td>
<td>Telecommunications</td>
<td>Associate</td>
</tr>
<tr>
<td>Janet</td>
<td>Female</td>
<td>N/A</td>
<td>Telecommunications</td>
<td>MS</td>
</tr>
<tr>
<td>Kate</td>
<td>Female</td>
<td>3</td>
<td>Wireless</td>
<td>MS</td>
</tr>
<tr>
<td>Evan</td>
<td>Male</td>
<td>6</td>
<td>Wireless</td>
<td>MS</td>
</tr>
<tr>
<td>Amy</td>
<td>Female</td>
<td>20</td>
<td>Document Imaging</td>
<td>BS</td>
</tr>
<tr>
<td>Rob</td>
<td>Male</td>
<td>6</td>
<td>N/A</td>
<td>BS</td>
</tr>
<tr>
<td>Mark</td>
<td>Male</td>
<td>16</td>
<td>Information Services</td>
<td>MS</td>
</tr>
<tr>
<td>Kirk</td>
<td>Male</td>
<td>10</td>
<td>Information Services</td>
<td>High School</td>
</tr>
<tr>
<td>Randall</td>
<td>Male</td>
<td>7</td>
<td>Wireless Telecom</td>
<td>BS</td>
</tr>
<tr>
<td>Cher</td>
<td>Female</td>
<td>8</td>
<td>Information Services</td>
<td>BS</td>
</tr>
<tr>
<td>Sam</td>
<td>Male</td>
<td>5</td>
<td>Consulting</td>
<td>BS</td>
</tr>
</tbody>
</table>

IT, Information Technology; PM, project manager.

Table 1. Participant demographics

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During the Set-up phase, the participant signed the Informed Consent form, provided demographic information and indicated whether voice recording would be allowed. Then, the participant identified six IT PMs (elements) with whom he or she had interacted in the current or a previous organization. We asked that they consider those who were successful as well as those who were unsuccessful. The names of each of the six PMs were written on individual index cards. Two cards were added to the stack as anchors, with one labelled ‘Ideal’ and one labelled ‘Incompetent’. The concept of anchors was introduced in Stewart & Stewart (1981), and the notion of ‘Ideal’ and ‘Incompetent’ was also used in Hunter (1997). These helped the participant differentiate between the elements by providing anchors representing what the participant considered to be ideal and incompetent in terms of IT PMs.

During the Triadic Elicitation process, the participant was asked to randomly select three index cards (a triad) from the stack. Constructs were then elicited by asking: ‘With regard to the skills of successful IT Project Managers, how are two of these PMs the same and yet different from the third?’ Participants were encouraged to verbalize thoughts while going through the decision process. In a process known as laddering, the researcher probed further, asking ‘how’ and ‘why’ questions to clarify meaning. To complete the processing of each triad, the participant was asked to provide a brief label that best described the construct and its contrast (bipolar). These labels and their underlying meanings were uncovered during the laddering process and placed on the RepGrid (see Table 2). The participant then placed the three cards back in the stack, shuffled the deck of index cards, and selected another three cards and the exercise was repeated. The participant continued selecting triads until either they could not think of any new constructs or they became noticeably tired. Reger (1990) suggests that 7–10 triads are normally sufficient to identify all relevant constructs for each participant. Our participants

![Figure 2. Interview methodology.](image-url)
selected between five and eight triads each. At the end of each interview, the participants were asked to rank the identified skills based upon their importance to successful IT project management.

**Step 2: determine skill categories**

Before conducting the data analysis, we needed to first examine the data set and verify that theoretical saturation had been reached. Many of the participants used similar language to describe important IT PM skills. After completing each block of roughly four to five interviews, the first two authors reviewed the raw skills in the resulting RepGrids to determine whether any new constructs had emerged. Theoretical saturation can be said to have occurred when subsequent interviews failed to produce new skills (see Figure 3). In this study, theoretical saturation had clearly occurred after 19 interviews. This sample size was consistent with Tan & Hunter’s (2002) recommended range of 15–25 interviews.

By design, our data-collection method allowed participants to freely choose both their elements for comparison (IT PMs) as well as their constructs of interest (skills associated with successful IT PMs). As a result, the interviews yielded 19 RepGrids which together included 147 elicited raw constructs. For the purposes of analysis, however, we wanted to consolidate raw constructs that were expressions of the same underlying idea. For instance, the phrases ‘strong follow-up’, ‘great on follow-up’ and ‘consistent follow-up’ used by three different participants were consolidated and mapped to the same unique skill. Consolidation of raw constructs yielded 46 unique constructs or skills.

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**Table 2. Sample from partial RepGrid**

<table>
<thead>
<tr>
<th>Construct</th>
<th>Rank</th>
<th>Ladder</th>
<th>Construct</th>
<th>Ladder</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theoretical understanding of PM</td>
<td>3</td>
<td>Knows tools to use on projects; understands steps and mechanics of PM</td>
<td>Not as theory based</td>
<td>Projects not as tightly controlled; does not follow set process</td>
</tr>
<tr>
<td>Level headed and calm</td>
<td>2</td>
<td>Better flow of communication</td>
<td>Angry and emotional</td>
<td>Communication stops when you get emotional</td>
</tr>
<tr>
<td>General knowledge of PM</td>
<td>6</td>
<td>Knows how to manage relationships</td>
<td>Lacks PM knowledge</td>
<td>Did not understand how to do a project plan</td>
</tr>
<tr>
<td>Willing to change approach</td>
<td>5</td>
<td>Does not compromise over objectives; manages stakeholders</td>
<td>Lacks flexibility</td>
<td>Set in their ways</td>
</tr>
<tr>
<td>Executive presence</td>
<td>1</td>
<td>Ability to read environment and match it</td>
<td>Excessive levity</td>
<td>Not serious enough when required</td>
</tr>
<tr>
<td>Motivating others</td>
<td>4</td>
<td>Knows how to drive people; knows when to balance being hard and soft</td>
<td>Not motivating</td>
<td></td>
</tr>
</tbody>
</table>

IT, Information Technology; PM, project manager; RepGrid, Repertory Grid.
For the next phase in the analysis, we needed a textual data-analysis method that would allow us to group these unique constructs into meaningful skill categories. A number of RepGrid analysis techniques have been described such as frequency counts, content analysis, visual focusing and cluster analysis (Stewart & Stewart, 1981; Jankowicz, 2004). We selected content analysis, a technique that allowed us to create thematic categories from the constructs described in the interviews (Krippendorff, 1980; Neuendorf, 2002). The goal of the content analysis was to develop a reduced set of skill categories that represented the constructs elicited by the IT PMs in our study. We followed the generic content-analysis procedure for RepGrids outlined by Jankowicz (2004). Briefly, this process involved identifying the categories and allocating the constructs to them, establishing the reliability of the category system and summarizing the categories. The first two authors worked together to identify the categories. The 46 unique constructs were listed on an index card and sorted into groups based upon the similarities among the skills. This was an inductive and iterative process that relied on the judgements of the two authors, their knowledge of project management concepts and familiarity with the interview data. Initial disagreements over sorting were settled by reviewing the laddering information and available transcripts. Once we were satisfied with the resulting nine groups, we named and defined each category.

To establish reliability, we evaluated the internal and external plausibility of the category system (Guba, 1978; Patton, 1990, p. 404) as well as its usefulness. To check internal plausibility (i.e. the relatedness of the unique constructs making up each category), the third author independently verified that the categories made conceptual sense and suggested changes where needed. External plausibility (i.e. extent to which the categories represent a relevant body of IT PM skills) was demonstrated by the fact that our category system was able to include all IT PM skills previously identified in the literature (Jiang et al., 1998; El-Sabaa,
2001) while adding two new categories. During our analysis of IT PM archetypes described later, we also found that these categories were useful in distinguishing groups of IT PMs according to their perceptions. While we fully recognize that arguments could be made for other arrangements of these unique constructs, these assessments strengthened our belief in the suitability of the category system at this exploratory stage. Future research can continue to develop these constructs and undertake a more systematic study to assess the validity of these categories (Straub et al., 2004).

We have summarized the resulting skill categories in Table 3.

Step 3: identify patterns across participants

In the final step in our analysis, we used clustering to examine patterns of skills that were deemed to be important across participants’ individual RepGrids, allowing us to identify four archetypes of successful IT project management practice. Clustering is an inductive process that allows items to be sorted into categories (Miles & Huberman, 1994). To perform the clustering, a table was created that listed the nine skill categories as rows and each of the 19 IT PMs as columns. The cells of the resulting matrix were populated by 0s and 1s, with 1 indicating that the IT PM’s elicited constructs had included that skill category and 0 indicating otherwise. Participants who listed the same skill categories were grouped together. In cases where there was not a perfect match among participants, we re-examined the transcript evidence and RepGrid to determine which group the participant most closely belonged to. Using this process, we were able to group the 19 RepGrids into the four IT PM archetypes that will be described and discussed later.

RESULTS AND DISCUSSION OF SKILL CATEGORIES

In this section, we describe the elicited skills that our subjects associated with successful IT PMs (see Table 3, sorted by most frequently mentioned skill category). In our descriptions, we highlight the ways in which key characteristics of IT projects and career paths may cause special concerns for the IT PM.

Planning and control

The planning and control skill category involves planning, monitoring and controlling project tasks to ensure that the project is completed on time and within the budget. This skill category was mentioned by all but one of our participants and ranked as most important by 6 out of the 19. While Jiang et al. (1998) mention ‘planning’, they do not identify control. El-Sabaa (2001) mentions the rather vague term ‘management’ but does not explicitly identify planning and control as an important IT PM skill. Participants in our study underscored the need for IT PMs to possess the skills needed to develop specific action plans, provide detailed work-breakdown structures, get the right people involved on each assignment, and constantly monitor and
<table>
<thead>
<tr>
<th>Skill category</th>
<th>Unique constructs identified</th>
<th># of subjects mentioning constructs in this category (N = 19)</th>
<th># of subjects ranking constructs as 'Most important' (N = 18)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning and control</td>
<td># (35 raw constructs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Control cost</td>
<td>- Project planning</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>- Create realistic schedules and estimates</td>
<td>- Provide detailed work breakdown</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Match people and tasks</td>
<td>- Respect project management principles</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Monitor and control project</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General management</td>
<td># (21 raw constructs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Delegate effectively</td>
<td>- Prioritize tasks</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>- Facilitate meetings</td>
<td>- Remain flexible</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Negotiate</td>
<td>- Remove roadblocks for team</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Organize</td>
<td>- Sense the environment</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Possess good interpersonal skills</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leadership</td>
<td># (17 raw constructs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Communicate goals</td>
<td>- Likeable</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>- Communicate a vision</td>
<td>- Political savvy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Level headed, calm</td>
<td>- Positive attitude</td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td># (17 raw constructs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Communicate to upper management</td>
<td>- Listen</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>- Communicate with staff</td>
<td>- Respond to others</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Foster communication between groups</td>
<td>- Speak directly and concisely</td>
<td></td>
</tr>
<tr>
<td>Team development</td>
<td># (16 raw constructs)</td>
<td></td>
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<tr>
<td></td>
<td>- Build team</td>
<td>- Motivate others</td>
<td>10</td>
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<td></td>
<td>- Care for employees</td>
<td>- Respect others</td>
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<td></td>
<td>- Develop team members</td>
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<tr>
<td>Client management</td>
<td># (14 raw constructs)</td>
<td></td>
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<tr>
<td></td>
<td>- Manage client relationships</td>
<td>- Understand the business</td>
<td>10</td>
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<tr>
<td></td>
<td>- Understand user requirements</td>
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<tr>
<td>Systems development</td>
<td># (12 raw constructs)</td>
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<td></td>
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<tr>
<td></td>
<td>- Focus on quality</td>
<td>- Technical expertise</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>- Manage complexity</td>
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<td></td>
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<tr>
<td>Problem solving</td>
<td># (eight raw constructs)</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>- Analyze root cause</td>
<td>- Take responsibility for errors</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>- Confront issues proactively</td>
<td></td>
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<tr>
<td>Personal integrity</td>
<td># (seven raw constructs)</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>- Be honest</td>
<td>- Hold ethical standards</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>- Does not play politics</td>
<td>- Put project success before self</td>
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control the project as it evolves. Three characteristics of IT projects can make planning and control especially challenging for IT projects: volatility of requirements, intangibility of software products and complexity of the system (Jurison, 1999).

Participants in our study indicated that an IT PM must not only develop a plan, identify task dependencies and allocate sufficient resources but must also actively manage changes to the project plan. The ideal IT PM, for example, adapts quickly to changes in requirements. Less competent IT PMs did not know how to manage these changes. In some cases, they would not create a project plan at all, instead trying to manage by intuition. In other cases, they would create a project plan at the beginning, but it would quickly get stale and become useless as various changes would not end up reflected in their plan. One participant expressed the importance of continuous planning as follows:

It’s project planning on a weekly basis, sometimes on a daily basis . . . Because if you just put the project plan together and then you shelve it somewhere, you might as well not have done the exercise anyway and you’re flying by the seat of your pants (Glenda, Triad 8).

Understanding that visibility of task progress may be difficult, the ideal IT PM intentionally and actively monitors the progress of the plan. IT PMs who were effective at monitoring and controlling projects were described as hands-on, assertive and consistent at follow-up. The less competent IT PMs were described as laissez faire, unaware of what is happening on the project and easily distracted. The following quote describing an incompetent IT PM illustrates these points:

He’s not as aggressive. He doesn’t have real good follow-up skills. He lets things fall through the cracks. He’s not meeting his deadline and he’s relying on other team members to complete a lot of the project management work (Kate, Triad 1, on incompetent).

General management

The general management skill category encompasses business and interpersonal skills required to appropriately manage themselves and others. Both of the previous studies also highlight the importance of general management skills; examples of these skills include the ability to handle troublesome situations, show empathy and delegate authority (Jiang et al., 1998; El-Sabaa, 2001).

Because meetings can be a source of wasted time, the ideal IT PM must know how to determine whether a meeting is required. If so, he or she should know how to effectively facilitate meetings. The ideal IT PM can save time by being organized and by reusing templates for project plans. The ideal IT PM also knows how to manage others. Incompetent IT PMs were accused sometimes of being too rigid and inflexible in their dealings with others: they saw only one way of completing a task – their own. By contrast, the ideal IT PMs knew how to negotiate, remained flexible and possessed good interpersonal skills that allowed them to get along well with others:

It’s flexibility and just being able to tailor their management style to the constraints and parameters of the project and the team (Laura, Triad 5).
Another part of managing others involves prioritizing tasks, assigning resources and delegating to others. In some situations, the IT PM’s prior technical background may make it more difficult to delegate tasks. The incompetent IT PMs may be more interested in actually doing the work themselves rather than delegating work to others. The ideal IT PM is someone who has made the shift from thinking of himself as a technician to thinking of himself as a manager:

If you promote a technical person to a manager and you tell that person you’re never going to write another line of code, the shift should be: how do I get things done through the people? . . . You’re focused on the issues of trying to manage a group of people – rather than technical issues (Paul, Triad 2).

Leadership

In the leadership category, we grouped skills related to the ability to form and communicate a message about the future direction of the project in a way that garners enthusiasm and commitment from others. Both of the prior studies on IT PM skills consistently prioritize leadership capabilities such as mobilizing employees towards a common goal and being sensitive to the political realities in the organization (Jiang et al., 1998; El-Sabaa, 2001). The IT PM must be clear about the vision and goals of the project and be able to communicate that to others.

Terms used to describe incompetent IT PMs include know-it-all, bossy, argumentative, or too forceful. Our subjects also mentioned personal traits of IT PMs that make them easy to get along with: being calm, presenting a positive attitude and generally being likeable. The ideal IT PM would exhibit good leadership and maintain professional behaviour in the workplace:

[Incompetent IT PM] is very emotional. In really high-pressure situations, I think her personality is such that she tends to get personally involved in it and takes on a lot of that stress. [Competent IT PM] doesn’t get emotional – just the right emotions if he needs to be forceful with someone as a project manager (Kate, Triad 3).

Communication

Communication skills refer to the ability of the IT PMs to effectively speak, write and listen to secure resources, enhance coordination, and ensure that work is completed. The importance of communication skills has been well developed within the literature. For instance, 5 of the 17 skills ranked in the Jiang et al. (1998) study stress the importance of oral, written, and verbal communication skills and map to the communication skill category. In addition, other studies have looked at the role that effective communication has played in systems development projects (Janson et al., 1993; Kraut & Streeter, 1995).

The ideal IT PM knows how to communicate both with project team members and senior management. Communicating about tasks and gathering data about current status can be a challenge and may require considerable effort – this is especially so in the case of virtual
teams. Project status must then be communicated to senior management. When doing so, IT PMs must be mindful of the many demands on executives’ time. A direct and concise form of communication should be chosen:

They’re good at . . . wrapping up the details into concise presentation. And effectively communicating to executives when there are showstoppers . . . but still filtering out the details (Kate, Triad 7).

IT PMs must be careful to listen to what others say and be responsive. One incompetent IT PM was said to not return phone calls or respond to email messages. Another had a reputation for not listening as people spoke.

IT PMs may also need to interact with others groups within their organization to promote cooperation across functional silos. The ideal IT PMs also make use of their extensive network of contacts to help them find solutions to problems.

[Ideal managers] were a lot more involved with people outside the team . . . Whether it’s networking or finding the right person to help motivate that external person or talking directly to that external person to help the project move along (Sean, Triad 6).

Team development

The IT PM with effective team development skills has the ability to create a productive team environment for those working on the project while demonstrating concern for their personal and professional growth. Team development has long been recognized by practitioners as an important factor in the successful management of IT projects. DeMarco & Lister (1999), for example, describe the importance of getting the team to gel. Although mentioned by over half of our subjects, neither of the prior studies on IT PMs (Jiang et al., 1998; El-Sabaa, 2001) had identified team development as an important skill. Our participants stressed that the ideal IT PM is aware of positive ways of motivating and inspiring team members, which could involve team-building exercises. When assigning tasks to individuals, the ideal IT PM is cognizant of the individual’s current skill level and whether additional training or mentoring might be required for the person to complete the assigned task:

This person was really good at training people, helping them reach their career goals, working with them to, um, get them where they wanted to be. He was very effective at listening to you and trying to get you on the path that you wanted to be going on (Laura, Triad 2).

Client management

Client management skills involve the IT PM’s ability to successfully relate to clients during all phases of the project. In terms of prior research, client management was not mentioned at all in the Jiang et al. (1998) study. The El-Sabaa (2001) study mentioned only one aspect of client management, which was the need to provide adequate training after the system is deployed.
In contrast, our study participants described the need to establish and maintain a good working relationship with the client throughout the project’s life cycle. IT PMs need to understand the client’s business environment enough to be able to consult with them and solve the client’s problems:

It’s inherently useful to know . . . what the customer experience is likely to be as a result of implementing this network or IT project. [Being] acutely focused on the customer view [is a] tremendous skill, because in the end that’s all that really matters (Evan, Triad 4).

The IT PM needs to give priority to this relationship, being responsive to clients’ requests and anticipating their needs. It is essential for IT PMs to firmly understand the client’s business or industry to assist in solving the client’s business problems. This background gives them a context for interpreting user requirements. Oftentimes, the IT PM needs to be able to look beyond the formally stated requirements. Problems can occur especially when the PM does not spend enough time in understanding the user’s requirements.

**Systems development**

The *systems development* skill category refers to the ability to understand and manage the technical aspects of developing complex, technical systems while controlling for quality. Having a technical background gives IT PMs credibility with their team members, helps them to understand the project and client needs, and assists them in preparing estimates:

The more [technically] sound you are, the better you can scope the project, the quicker you can make sure you have the right resources, the quicker you can determine if a name that’s submitted to you isn’t the appropriate one (Evan, Triad 1).

The systems development skill category goes beyond technical competence. It also involves being able to effectively manage the complexity of creating IT systems. The ideal IT PM understands the big picture of the system and how tasks are related. By contrast, the incompetent IT PM is too detail oriented and does not have sufficient understanding of the overall goal and complexity of the system to make good decisions.

Consistent with many skills listed by El-Sabaa (2001), the systems development category captures the ability of the IT PM to understand the technical complexities of the system being developed and to also have appropriate knowledge of required tools, technology and domain knowledge. The Jiang *et al.* (1998) study was limited in its development of this construct, only looking at the ability of the IT PM to understand the impact of requirements changes on the system. This restricted view of the IT PM’s role in this regard may be an artefact of Jiang *et al.*’s (1998) decision to base their questionnaire on the skills deemed to be necessary for systems analysts.

**Problem solving**

*Problem solving* skills involve the ability of the IT PM to address problems efficiently and effectively. Problem solving skills were missing entirely from the Jiang *et al.* (1998) study,
although the El-Sabaa (2001) study did mention the importance of a ‘strong problem orientation’. Our research clearly shows that competent IT PMs must proactively address problems. They must know how to analyze the root causes of problems and be willing to take responsibility for any problems that occur.

In order to successfully finish projects, IT PMs must remain focused on meeting their goals. However, various obstacles often occur that threaten to derail the project. Successful IT PMs have a high level of awareness about potential issues. When presented with issues, they gather information about the problem and use their analytical abilities to get to the root of the problem. This allows them to plan an appropriate course of action. By contrast, incompetent IT PMs are not as systematic about managing issues. In some cases, they act impulsively without getting input from others. Other incompetent IT PMs suffer from issue avoidance. Still others deny responsibility for problems, blaming others for errors.

**Personal integrity**

The IT PM who demonstrates personal integrity acts in a manner consistent with high ethical standards as opposed to self-interest. IT PMs who lack personal integrity were most likely to be considered incompetent. Incompetent PMs are often more concerned about their own career advancement than the success of the project. To that end, they would consider dishonesty and political manoeuvres to be acceptable techniques.

While personal integrity only accounted for less than 5% of the personal constructs elicited, the fact that it surfaced here is interesting, particularly given the fact that it had not been identified in prior studies. In light of Enron and other corporate scandals, it is conceivable that personal integrity is something that is on the minds of many today and of growing importance. While arguably more of a personality characteristic or a descriptor of how someone conducts himself/herself, we include personal integrity as a ‘skill’ for we believe that ethical behaviour is something that can be taught if a person is provided with the proper foundation and mentoring. This idea behind personal integrity is consistent with management literature that looks at the role of character (Barlow et al., 2003).

Figure 4 shows the distribution of elicited constructs grouped by the categories previously discussed. Planning and control, general management, communication, and leadership represented the most frequently elicited constructs and together they accounted for 61% of the raw constructs elicited in the RepGrid process.

**IT PM ARCHETYPES**

During the final stage of data analysis, we examined how participants combined the skill categories when describing the ideal IT PM. Participants were placed into four groups based upon how closely their identified skill sets matched. To graphically represent the relative weights of our categories, we totalled the number of times each category was mentioned by participants in this group. The star chart shows the percentage of time each skill category was
mentioned within the group. In the succeeding sections, we describe the beliefs that most distinguish each of the four IT PM archetypes.

**General Manager (GM) archetype**

The five dominant skill categories that clustered to represent the GM archetype are communication, general management, planning and control, team development, and leadership. The star chart in Figure 5 shows a graphical representation of the dominant skill categories exhibited by the IT PM as GM archetype. Three IT PMs in the study mentioned constructs that overlapped perfectly with this profile (Kirk, Kate and Paul); another three IT PMs mentioned a set of constructs that differed from this profile by only one construct (Glenda, Mitch and Jennifer). According to the GM archetype, effective PMs are internally focused and demonstrate high amounts of business knowledge.

With team members, the GM uses solid communication skills to clearly specify the roles and responsibilities of each individual at the beginning of the project. The GM’s leadership ability enables him/her to successfully motivate and inspire team members to perform their best work. The GM interacts with others in such a way as to demonstrate respect and concern. When obstacles occur, the GM is more likely to engage in conversation with people in a way that focuses on solutions. The GM demonstrates concern for team member needs by active participation during crisis situations. One participant, Glenda, described how the IT PM stayed...
late on the night before a critical software release to support the development team, even buying dinner for those who worked extended hours. She realized that she could not make technical contributions to the resulting software product; however, she stated that ‘being there for your employees’ was important.

By contrast, Paul described the incompetent IT PM as unaware of the needs of the team:

Basically, the subordinates are not even in their field of view. They have people reporting to them but they’re not aware of them, aren’t sensitive to them (Paul, Triad 2).

Other terms used by this group to describe how the incompetent IT PM relates with the team include bossy, commanding, intimidating and abrasive.

In addition to working well with the team, the GM also knows how to successfully manage relationships with upper management. The GM would tailor communication for executive audience, providing concise, summarized information in the preferred format. The GM also consistently presents a positive, professional image, which was described by one participant as a ‘can do’ attitude and by another as having an ‘executive presence’. The GM remains calm and level headed even during crisis times.

The GM archetype is distinguished from the other IT PM archetypes in some other interesting ways. First, the GM expresses little concern for technical competence as represented by

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the systems development and problem solving skill categories. Second, personal integrity is a more salient characteristic of the GM archetype relative to the other three IT PM archetypes identified.

**Problem Solver (PS) archetype**

According to the PS archetype, the qualities of ideal IT PMs include competency in planning and control, leadership, team development, systems development and problem solving (see Figure 6 for a graphical representation). Two IT PMs in the study mentioned constructs that overlapped perfectly with this portfolio of skills (Edward and Janet) while one other IT PM mentioned these skills plus the importance of communication (Mark). The PS archetype describes a hands-on, detail-oriented PM who makes use of technical expertise to actively control and manage the complexity of IT projects. The PS also serves as a team leader with responsibilities for motivating others and building the team.

One distinguishing factor of the PS archetype is the importance of managing issues. These participants all mentioned that successful IT PMs must confront issues proactively and have a strong analytical ability in order to get to the root cause of the problem.

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*Figure 6. Problem Solver star chart.*

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[They] identified a situation that needed to be addressed and addressed it right then (Mark, Triad 3).

Another distinguishing characteristic is the importance placed on technical competence, which is part of the systems development skill category. Part of technical competence involves understanding and managing the complexity of the IT system. In speaking about an incompetent IT PM, Edward talked about some of these challenges that were not adequately handled:

[Incompetent manager] was not able to integrate diverse sets of goals or project goals and schedules and milestones . . . There’s always a challenge to deliver a product or products with all of those different components (Edward, Triad 3).

Having a technical background also ensures that the effective PM can communicate with both the technical people with whom they manage to get work done as well as clients.

This person [ideal] was on a technical project and he could speak with direct authority to the customer and have credibility. In this situation, these people [incompetent] could not have done that (Mark, Triad 4).

**Client Representative (CR) archetype**

According to the CR archetype, the qualities of ideal IT PMs include competency in planning and control, communication, general management, systems development and client management (see Figure 7 for a graphical representation). Compared to the GM, this viewpoint agrees that communication and general management skills are important, but it focuses less on leading and managing others internally. More emphasis is placed on using these skills in managing the relationships with the client. Four of the IT PMs in the study mentioned constructs that overlapped perfectly with this portfolio of skills (Wayne, Evan, Sam and Amy); two other IT PMs matched except for having one extra construct (Cher, Rob). The CR archetype emphasizes the importance of interacting with the customer.

So the people that are . . . acutely focused on the customer view. I think that’s a tremendous skill because in the end that’s all that really matters. By consistently asking what’s going to be the customer experience as a result of this change? What’s going to be the customer experience as a result of that change? You do that by keeping the customer – the eventual customer experience – in the forefront (Evan, Triad 4).

Like the PS, managers with this viewpoint placed at least some importance on the systems development skill category, emphasizing that the ideal IT PM needs to combine technical and people skills.

**Balanced Manager archetype**

The remaining four IT PMs in our study took more of a balanced view (see Figure 8) as to what it means to be an IT PM. Three of these IT PMs identified skills from seven of the nine skill
categories. The balanced view is one that suggests that successful IT PMs need to possess and draw upon virtually all of the skill categories.

**DISCUSSION**

To summarize, this work offers two main contributions. First, we offer a list of nine skill categories that IT PMs perceive as necessary for successful project management practice. Such a list can provide an initial basis for understanding the attribute-based part of IT PM competency. Second, we have identified four IT PM archetypes that capture the different perspectives of our subjects as to the combination of skills exhibited by the ideal PM. In this section, we reflect upon the implications of these findings, acknowledge the study’s limitations and suggest directions for future research.

**Implications**

This study has important implications for research, practice and education. For researchers, the study provides empirically grounded insight into the skills needed to be a successful IT PM.
By grouping these skills into nine categories, this research provides a foundation for future research on the relative importance of various skill categories and how these may affect project outcomes. The identification of distinct IT PM archetypes also has an important implication for research. One interesting avenue for future research would be to explore whether the different IT PM archetypes are equally effective or whether some are superior to others depending upon the project and organizational context. For example, in more bureaucratic organizations with multiple layers of management, the GM archetype may be more successful at navigating the internal workings of the organization. Several interesting research questions emerge from the archetypes identified in this research including: (1) Are there specific weaknesses that a PM adopting one of these archetypes may suffer? and (2) How can an IT PM who fits a specific archetype know which project opportunities will best match his/her skill set?

For practitioners, the study has important implications for both recruiting and career development. Specifically, both assessment and training tools could be developed around the skill categories identified here. Such tools would prove to be a valuable way to gauge the skills of current and potential IT PMs and to deliver training programmes that are specifically tailored to an individual’s needs.

The study also has important implications for educators in the IS area who seek to provide a well-balanced training in the area of IT project management. IT PM courses and IT PM
curricula should be evaluated in light of the extent to which they promote the development of the types of skills identified in our study. While a course in IT PM may cover specific tools and techniques from the planning and control skill category, how can we develop the other skills in an IS undergraduate or graduate curriculum? The use of capstone courses or internships may be a vehicle for sharpening students’ abilities in several of the skill categories listed here (e.g. interacting with clients), which can be difficult to achieve in the traditional classroom setting.

Limitations and future research

As with all research, there are limitations to this study that should be acknowledged. First, we focused on the perceptions of IT PMs. However, other stakeholders (e.g. senior management, clients, or project team members) may hold alternative views about what is important. Future research could compare and contrast the perceptions of these various stakeholders to see if new skill categories emerge. Previous research that has asked both IT professionals and end-users to rank skills has shown that these stakeholder groups assign different priorities. For example, Green (1989) found that users valued technical skills over interpersonal skills, whereas the systems analysts themselves placed higher importance on non-technical skills. It would be interesting to know if conflicting perceptions exist with respect to IT PMs and their main constituency groups – clients, project team members and senior management.

Second, we have used a convenience sample of IT PMs to explore skill categories and IT PM archetypes. These IT PMs worked on a variety of projects with various levels of responsibilities. Future research could repeat the research design using theoretical sampling to confirm our initial results and explore how individual, project, or organizational characteristics impact the derived skill categories and archetypes. Another interesting extension of this work would be to examine cross-cultural differences that may exist in terms of skills or IT PM archetypes. Research has shown that leadership concepts vary across cultures (Brodbeck et al., 2000), and it may also be the case that the skills associated with ideal PMs vary across cultures as well. The increased prevalence of offshore development and virtual teams that must collaborate across time and distance underscores the importance of investigating the impact of culture on the perceptions of IT PM skills.

Third, like much of the general IT skills literature, this research adopted a skills-as-attributes perspective on IT PM competency. By using the RepGrid technique, we relied on the participant’s ability to recognize and articulate what makes IT PMs successful. However, this approach may capture only espoused theories of IT PM practice rather than actual theories in use (Argyris, 1985). A nice complement to this study would be to conduct future research on IT project management skills from a skilful practice perspective.

Finally, we have explored skills-as-attributes without any examination of how these skills affect IT PM performance. Further work is needed to examine whether and how the skills and archetypes identified here affect IT project performance. Specifically, it would be extremely helpful to develop a contingency framework that provides insight into which skills and archetypes presented here impact project performance and under what circumstances.
CONCLUSION

In spite of the limitations described earlier, this paper contributes significantly to our understanding of the skills associated with successful IT PMs. Our findings confirm the importance of many skills previously described in the literature (e.g. communication, general management, leadership, planning and control, and systems development) while providing a richer understanding of several other skills that were narrowly defined previously (e.g. client management, planning and control, and problem solving). Moreover, the study points to two other skill categories that had not been discussed at all in the prior literature on IT PM skills: personal integrity and team development. We have also identified four archetypes that represent beliefs held by our experienced IT PMs about the required combination of skills associated with ideal IT PMs. With four different perspectives presented, it may be tempting to ask the question: which way is right or best? We do not argue that any one way is better than another. Instead, we focus on what can be learned from understanding patterns of managerial cognitions. These archetypes represent a set of beliefs about managerial effectiveness while at the same time identifying a portfolio of skills that an IT PM could possess. These findings provide a strong foundation for future research into IT PM skills and the relationship between those skills and managerial effectiveness.

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**Biographies**

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