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Beyond the Generalist:
The Overlooked Importance of Technical Expertise in IT Project Management

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ABSTRACT

International frameworks and accreditations define the core competencies required of information technology (IT) project managers. Among these, technical skills are often cited as important, particularly in IT-focused projects. However, the technical competencies required—and the extent to which project managers should possess them—remain unclear. The literature on this topic is limited, though existing studies indicate that technical proficiency contributes to project success in technical domains. To explore this gap, semi-structured interviews with IT project managers and project participants were undertaken to examine perceptions of technical skills. Findings reveal a divide between participants with technical education, who emphasized the necessity of technical expertise, whereas those without technical qualifications highlighted communication, motivation, and attitude as most critical. The study contributes insights into the strategic value that technical capability adds to IT project management effectiveness through the strategic capability model for technical project management.

KEYWORDS

Information Technology Project Management, Project Manager, Technical Skills, Certification, Competencies, Attributes

INTRODUCTION

Project management has been widely accepted for decades as a domain requiring a suite of skills and specialized competencies applicable across diverse industries (Carter, 1988; Hodgson, 2008; Reed, 1996, 2007). However, in the context of information technology (IT) project management, a duality often arises wherein project managers are expected to possess not only generalist competencies but also sufficient technical expertise to engage meaningfully with complex systems and technical teams. These skills and capabilities have been increasingly standardized, refined, and credentialized to acknowledge both the threshold capabilities and the higher functioning capabilities common to the project management skill set. This distinction has become increasingly pronounced with the rise of agile methodologies and the proliferation of digitally intensive projects.

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Although frameworks such as the Project Management Institute's (PMI) Project Manager Competency Development Framework and the International Project Management Association's (IPMA) Individual Competence Baseline offer comprehensive models of project management competence, they tend to be domain-agnostic and arguably underemphasize the role of technical skills in complex IT environments. The PMI Project Manager Competency Development Framework explicitly describes the framework as "designed to apply generically to all project managers, regardless of the project's nature, type, size or complexity" (Cartwright & Yinger, 2007). IPMA's Individual Competence Baseline describes a global, cross-domain competence baseline of people, practice, and perspective (Rezende & Blackwell, 2019). Delphi and empirical studies of IT project managers by Ahmadi-Eftekhari et al. (2022) and Keil et al. (2013) revealed IT-specific skills as critical for IT project success. These authors argued for competency models that capture the special demands of IT projects and highlighted the need for targeted competence research.

While established skills for the project manager role include project management knowledge, interpersonal skills and attributes, social competencies, management capabilities, cognitive skills, influencing skills, team working, contextual skills, and emotional skills, among others, there is a noticeable lack of empirical research detailing the specific technical skills required of project managers operating in IT environments. Competency studies (such as Abramo et al., 2017) tend to generalize competencies across sectors (e.g., construction, healthcare, business, technology), failing to account for the distinct demands of technical IT projects that involve complex systems, evolving technologies, and interdisciplinary coordination. The appointment of a project manager who fits the needs of a project has become a known factor in success (Ahmadi Eftekhari et al., 2022; Carlton, 2017; Pollack & Adler, 2016; Varajão & Takagi, 2024).

Authors, such as Varajão and Takagi, (2024), have argued that it is "…important to define strategies for improving and developing information systems (IS) project manager's technical capabilities in an organization" (p. 280). Ribeiro et al. (2021) argued that the project manager role needs to be accompanied by new technical, contextual, and behavioral competencies addressing the need to adjust to a paradigm shift from the fourth technological revolution (*Industry 4.0*). They cited several enabling technologies considered to be the main pillars of Industry 4.0: cyber-physical systems, Internet of Things, cloud computing, big data and data analysis, additive industry (3D printing), robotics, virtualization and simulation, cybersecurity, augmented reality and the applications of artificial intelligence (AI). Similar thoughts were offered by Lele et al. (2019). Đajić et al. (2024), in their development of a Project Manager Skills Scale, also argued that technical knowledge-based competence is recognized as part of the project manager competence profile in IT projects. Koi-Akrofi et al. (2024) further supported the claim that project manager competence is more than just the soft, behavioral, or leadership skills embedded in the project manager role. They saw what they called hard technical computing skills as being complementary with the knowledge of project management processes. They established computing skills as a recognized part of their core competence profile. However, their review is generic in terms of which hard computing skills are considered necessary, and the review is highly project-management-process-oriented, rather than offering an exploration of the specific technology domain or IT-specific expertise required.

Given this gap, there is a case to be made that, for complex IT projects, more specialized technical expertise (such as knowledge of systems, architecture, and technical domain) should be considered a *strategic capability* beyond generic computing or project management tool literacy. In the context of global software development (GSD) projects, Alqahtani et al. (2024), identified and prioritized critical success factors for managing software projects in GSD environments. They argued that traditional project management practices often fail to address the unique challenges of GSD projects (such as the effects of time zones, distributed teams, communication barriers, cultural barriers, and issues of technical heterogeneity) and thus argued that project managers need relevant technical capabilities aligned with GSD's complexity.

From a socio-technical systems perspective (Trist & Bamforth, 1951), IT projects comprise tightly coupled social and technical systems whose performance depends on their joint optimization rather than on isolated technical or human factors (Sarker et al., 2019). As projects become more complex and technology-intensive, the project manager's role sits more and more often at the nexus of these interacting subsystems, requiring integrated technical, interpersonal, and managerial competencies rather than domain-agnostic capability profiles.

Despite widespread recognition of the importance of technical fluency in the project management role, few studies have yet examined the extent to which such technical expertise contributes to project outcomes or team effectiveness in IT contexts. This study was therefore undertaken to address the following research question: To what extent is technical expertise required of an IT project manager? Our aim was not only to explore this question empirically through interviews with professionals in the IT sector, but also to address a notable gap in the literature, specifically, the lack of research specifying the technical skill requirements of project managers operating within the IT domain. By doing so, we intend to support both theory development and practical applications for competency assessment, recruitment, and training.

Ultimately our exploratory study argues that in the context of IT project management, technical expertise is not merely a desirable attribute but a strategic capability (Jugdev, 2004; Weritz et al., 2024) that enhances credibility, communication, decision making, and project success. In the literature, *strategic capability* has been defined as the unique bundle of skills, resources, knowledge, and processes that enable organizations to implement strategy and gain competitive advantage (Weritz et al., 2024). In IT-project-oriented research, studies have shown that technical IT capabilities mediate the relationship between dynamic capabilities and strategic outcomes such as agility and project success (Awwad et al., 2022). Project management practices have also been shown to serve as a mechanism for the development and re-configuration of dynamic and strategic capabilities in open innovation projects (Patrício et al., 2021). While it is evident that soft skills and project management frameworks remain vital factors for success, technical fluency arguably enables project managers to reduce ambiguity, better coordinate with technical stakeholders, and make informed decisions—ultimately improving project performance in environments characterized by complexity and uncertainty.

LITERATURE REVIEW

There are many types of project managers across various sectors (Sydow et al., 2004). The role of a project manager has an extremely wide and influential scope that includes financial analysis, risk management, stakeholder analysis, and communication. Specifically in the IT field, the project manager role involves many areas that rely on technical knowledge as this role has a large decision making component in terms of budget, staffing, and technology-related decisions. Thus, project management, as a profession, is well documented through international competency frameworks.

General Project Management Competency Frameworks

The PMI and the IPMA each provide widely used models and processes (Hedeman & Riepma, 2023; IPMA, 2018; PMI, 2025) that describe core competencies such as leadership, communication, and planning. However, both frameworks underrepresent the role of domain-specific technical expertise, particularly in IT project environments. Müller and Turner (2007) emphasized the significance of aligning project managers' leadership styles with project types, but discussed technical skills only implicitly. Crawford (2005) similarly argued that project success is influenced by competence alignment yet provided no granularity on technical requirements. An earlier version of the PMI "Talent Triangle" included technical project management as one pillar, however, the interpretation broadly included skills such as scheduling and risk analysis rather than technology-specific fluency.

Gaps in Current Standards

Certification schemes such as *PRINCE2*, *ITIL v4*, and the *Scrum Guide* define roles and processes yet generally assume a separation between project leadership or management and technical execution. *PRINCE2*, for example, focuses on process governance rather than content expertise. *ITIL v4* introduces service management fluency but does not delineate specific technical proficiencies required of project leaders. Scrum roles often require working knowledge of development practices, but even here the expectations are variable and context-dependent.

From a socio-technical systems perspective, such domain-agnostic competency frameworks implicitly privilege social and managerial capabilities while treating technology as a contextual backdrop rather than an active subsystem. This abstraction becomes increasingly misaligned with IT project environments in which architectural decisions, platform constraints, and technological interdependencies directly shape coordination, risk, and delivery outcomes.

Technical Credibility

Despite the agnostic focus of these frameworks, practitioners have frequently highlighted the importance of technical skills in IT projects. Pant and Baroudi (2008) suggested that technical competence is a critical success factor, yet they do not define what constitutes technical competence or how much is necessary. Gillard (2009) identified technical credibility as essential to stakeholder trust but also failed to specify thresholds or evaluation methods. Case and Piñeiro (2009) argued that relationships between software developers and project managers can become unstable as developers believe they are superior in regard to capability. They also mentioned that non-technical project managers appear to have a lower value to a project as they are non-technical. Goodwin (1993) argued that when working with technical specialists, the project manager should be able to understand the nature of the project and communicate with the team at a technical level. Earlier authors, such as Mantel and Meredith (1986), posited that some of the overriding factors leading to successful project management included technical credibility amongst the team and an ability to use a systems approach for completing tasks that met performance standards on time and within planned costs.

What has been known for some time is that technical expertise provides an element that enhances the ability of a project manager to communicate, manage, and lead through the complexity that typically develops during a technical project's life cycle (Lewis, 1998). However, as Monson (2000) argued, "technical expertise does not correlate directly to successful project management" (p. 3). The project manager, as a first principle, should also never become the subject matter expert in the project.

Looking at developing project competence, Söderlund et al. (2008) noted that the lack of technical knowledge triggers behaviors that lead to a strong desire in project managers to access and develop technical skills in order to achieve these competencies. Pant and Baroudi (2008) stated that in order to manage projects somewhat successfully, one of the core skills required is technical competence. However, they did not make it clear what the extent of that required technical competence is, nor how a lack of it may impact on any given project.

Agile and Hybrid Project Environments

The rise of agile methodology has arguably transformed the boundary between technical and managerial roles, transforming the way projects are managed and delivered. Highsmith (2009) noted that agile project leaders must often operate with cross-functional awareness and technical grounding. Like others, Moe et al. (2010) described agile project leaders as "boundary spanner*s*" who bridge communication gaps between developers, stakeholders, and executives. In such environments, a lack of technical fluency may reduce the effectiveness of a project manager, resulting in communication breakdowns, slower decision cycles, and reduced team cohesion. These authors also highlighted the critical importance of technical knowledge in a project manager working in an IT context, both to enable communication and to generate trust and confidence from the technical team. Researchers' insights have suggested the importance of having technically competent project managers as an

advantage in many areas whether that advantage lies in a project manager's ability to gain confidence and support from their team, or to develop stakeholders' trust by translating technical complexity into relevant language at the stakeholder interface.

Need for Further Empirical Investigation

Although the literature suggests that technical fluency can improve project outcomes, there remains little empirical research to date that explores what technical skills are necessary, to what extent, and under what conditions. This lack of clarity undermines efforts to recruit, train, and develop effective IT project managers. Riaz et al. (2017) further called for context-specific evaluation frameworks to assess team expertise in software development environments, underscoring the need for detailed competency taxonomies.

The literature demonstrates a significant shortfall in empirical, domain-specific research on the technical competencies of IT project managers. Frameworks and certification bodies acknowledge the importance of technical competence but provide little guidance on what skills are needed, how they vary by context, or how they influence project outcomes. The present study explores this gap from the perspectives of professionals directly involved in IT project work, as an exploratory foundation for future competency model refinement.

METHOD

The present study adopted a qualitative, interpretivist methodology (Guba & Lincoln, 1994) suited to exploring the subjective perspectives of IT professionals on the role of technical expertise in project management. The goal was to understand the lived experiences and contextual meanings that practitioners assign to technical competence within IT project environments.

The approach aligned with the idea that participants involved in IT projects construct the meaning of their work directly, through being a project manager, or socially, through working with project managers. We also hoped to uncover an informed understanding of the social world of the IT project by exploring the subjective views of those pragmatically linked to IT project delivery.

Competencies are often individual, and perceptions of them can be highly subjective (Thorpe, 2016). In the context of the uncertainty and complexity of an IT project, competencies were likely to be socially constructed according to the stakeholder perspectives and particular needs of the project as they moved through the phases of the product life cycle. Interviewing project managers and collecting perspectives on aspects of the technical competencies needed at the various phases of a project provided a rich dataset for uncovering the important factors from those individual perspectives.

Research Design

Given the exploratory nature of the study, semi-structured interviews were selected as the data collection technique. This approach allowed for both consistency in core questions and flexibility to probe individual experiences and viewpoints in depth. While participants held diverse professional backgrounds and levels of experience, the data collection and analytical approach were oriented toward identifying shared patterns of meaning across participants rather than enabling systematic comparison across organizational roles. Accordingly, the analysis focused on thematic convergence related to competency domains rather than role-based triangulation, consistent with the study's exploratory intent.

Ethical Considerations of the Study

The ethical implications of the study were considered and, because the study collected opinions and perspectives from people about their workplace processes and roles, an ethics application was submitted to the Auckland University of Technology Ethics Committee, and approval was granted. All participants received a participant information sheet with details about the study, its purpose, data security

procedures, and intended outcomes. Participants provided informed consent by signing a consent form. To ensure confidentiality and anonymity, no personally identifiable information was collected, and codes were used in the findings to represent the participants' comments.

Participant Selection

A purposive sampling strategy was used to recruit participants with direct experience in IT project environments. We interviewed 12 professionals, including project managers, software and network engineers, a product manager, a senior systems specialist, and a CEO. This range ensured a balance between those managing projects and those working closely with project managers. Participants had at least two years of professional experience and represented varied educational and certification backgrounds. As is common in agile contexts, three of the participants were in hybrid roles in which their technical role was their HR-role and contained their job title, while they were also performing in a project manager capacity (see Zasa et al., 2020). For instance, participant 10 stated the following:

> *Although my HR role doesn't state that I'm a project manager, I do manage a lot of projects and project management is one of the capabilities that we need to have for this particular role. So, I do run presently about three or four projects. (P10)*

Table 1 summarizes the profile of participants involved in this study.

Table 1. Summary of interview participants involved in the study

Participant Group	Number	Key Characteristics
Project Managers	4	Non-Technical Background
Software Engineers	2	Technical Background
Network Engineer	1	Technical Background
Product Manager	1	Non-Technical Background
CEO	1	Non-Technical Background
Senior Engineer	1	Technical Background
Senior System Specialist	1	Technical Background
Machine Learning and Data Science Technical Support Engineer	1	Technical Background

Data Collection

Depending on the participant's availability and geographic location, data was collected through semi-structured interviews conducted in-person, by telephone, or via the Microsoft Teams video conferencing platform. This multimodal approach supported access to participants with diverse professional backgrounds while maintaining consistency in interview structure and depth.

Interview questions were piloted with two doctoral candidates and two IT professionals prior to data collection. This piloting process informed minor refinements to question wording and sequencing and prompts to improve clarity, relevance, and accessibility for participants with varying educational and professional backgrounds. The final interview protocol remained flexible, allowing for follow-up questions and probing in response to participants' experiences and expertise.

Participants were recruited using purposive sampling to ensure variation in educational background, professional role, and level of technical engagement within IT projects. The final sample consisted of 12 participants with experience working as IT project managers, technical specialists who had managed projects, and senior practitioners who regularly interacted with IT project managers in delivery contexts.

Each interview lasted between 50 and 120 minutes. All interviews were audio-recorded with participant consent. Where video conferencing platforms were used, automated transcription functions were enabled to support initial transcript generation. The researchers subsequently reviewed these automated transcripts in full while listening to the original audio recordings. This process involved correcting transcription errors. Transcripts were returned to participants to verify that participants' intended meanings were accurately captured. The transcription review also functioned as an initial phase of familiarization with the data, consistent with Braun's and Clarke's (2021) reflexive thematic analysis (RTA).

Data Analysis

Data were analyzed using RTA as outlined by Braun and Clarke (2021). This approach was selected to support an interpretive and theoretically informed analysis of participants' accounts while recognizing the active role of the researcher in knowledge production.

Familiarization and Initial Coding

Analysis began with repeated reading of all transcripts to develop familiarity with the body of data. During this phase, the researchers noted initial impressions, recurrent patterns, and points of divergence across participants and in coding. Initial coding was conducted inductively, with codes generated directly from the data rather than from pre-existing frameworks or competency models.

Coding focused on semantic and latent meanings in participants' descriptions of technical skills and knowledge; project management practices; decision making processes; interactions with stakeholders and technical teams; and perspectives on education, certification, and experience.

Codes were applied flexibly, with multiple codes often assigned to the same data segment. For example, a single excerpt describing early identification of technical risks might be coded simultaneously as *technical fluency*, proactive risk detection, and project sense-making.

Theme Development and Iterative Refinement

Following initial coding, codes were examined for patterns of shared meaning and organized into themes. This process involved moving iteratively between coded extracts, comments extracted from the full dataset, and the emerging themes. Themes were refined through repeated cycles of review and re-labelling to ensure internal coherence and clear distinction between themes.

Throughout this process, earlier transcripts were reviewed as new insights emerged. This iterative cycle meant that we kept later interpretations aligned across the full dataset rather than privileging earlier or later interviews.

As analysis progressed, two additional themes—technical fluency as boundary-spanning and the IT project manager as *sense-maker*—were identified. These themes were not present in the initial thematic structure but emerged through deeper engagement with participants descriptions of the enactment of technical skills in real project contexts. Subsequent interviews were analyzed with explicit attention to these emerging patterns, confirming their relevance and analytic robustness.

Sample Size and Analytic Sufficiency

The final sample comprised 12 participants. The study sought conceptual development consistent with qualitative research principles, rather than aiming for statistical generalization. Participant recruitment continued until analytic sufficiency was achieved, defined as the point at which additional interviews no longer generated substantially new insights into the developing themes. By the 12th interview, core themes related to education, experience, technical competency, and perceived value of technical skills were consistently recurring. The later interviews contributed richer illustrations and greater conceptual clarity but did not materially alter the overall thematic structure, indicating that sufficient depth and variation had been achieved.

Reflexivity and Trustworthiness

Consistent with RTA, the researchers acknowledged their role and experience in IT project management and in IT project management in an academic setting, an acknowledgment that informed both the interview process and analytic interpretation. Reflexivity was maintained through continuous engagement with the data, awareness of pre-existing assumptions, and deliberate openness to themes that challenged or extended initial expectations.

Trustworthiness was supported through documentation of analytic decisions, verbatim quotations in reporting, and iterative engagement with the full dataset. The aim was not to seek global consensus or coder reliability, but to provide a coherent, well evidenced interpretive account that could represent participants' experiences while contributing new conceptual insight into IT project management capabilities.

FINDINGS

The findings are structured around seven high-level themes identified through categorizing and grouping analysis of the interview data from the twelve participants. These themes include the following:

- perspective differences between higher-educated and non–higher-educated persons,
- perceived benefits of industry qualifications,
- importance of practical hands-on experience versus a narrower academic, specialized approach,
- perceived skills required of an IT project manager,
- perceived benefits of an IT technical skillset,
- technical fluency as boundary spanning, and
- the IT project manager as sense-maker.

Perspective Differences Between Higher Educated and Non–Higher-Educated

There was a mix of higher-educated and non–higher-educated interviewees, leading to differences in what was considered important in IT project management during discussions of the best fit for a project manager. For instance, one participant stated,

> *I have also seen, and have also had, team members who didn't have that higher education or have not taken up the education, yet they were very successful in the roles… if you're not groomed in that direction through education, then you sort of come as just a fresh start. (P10)*

This participant also saw higher education as providing global mobility and perspective expansion. "For me higher education was very important… because I come from one culture, one country. In order to actually expand my horizon across global borders, it gave me that edge" (P10). Participant 12 commented that "No higher education level people… they may be very smart, they may be very clever… but they always need to teach themselves from scratch to get a systematical thinking way" (P12).

While three interviewees stated that almost everyone in their workplace held at least one university qualification, five of the interviewees believed that higher education qualifications, although not an absolute requirement for the role, demonstrated that a person had applied themselves to a course of study and were able to meet the challenge and complete tasks in order to obtain a qualification. Thus, the higher education qualification showed that the individual had tenacity and could follow a path to a defined objective. Others mentioned that completing a higher education qualification teaches people how to think and helps to aid problem solving once they are in the workplace. Participant 4 stated,

Tertiary qualifications provide a good indication that someone has applied themselves to a course of study and completed the tasks required to obtain that qualification. Therefore, they have a level of tenacity and can follow a path to a defined objective. (P4)

On the whole, participants with a higher education degree, particularly in a technical field, confirmed that they believed technical knowledge was highly important in an IT project manager, while the less technical or non–higher-educated participants looked at interpersonal skills as being more important.

Perceived Benefits of Industry Qualifications

One question asked was about the importance and relevance of an industry certification for project management. From the data gathered, it appeared that participants who have held a long-term role as a project manager have stated that at some point during their career, they studied and gained an industry qualification. The competence from industry qualifications was considered a time-sensitive factor, not a static concept, and different skills appeared to matter at different career phases. Participant 10 described it as being relevant in early career stages: "These certifications helped me at that time of my journey" (P10). Participant 11 mentioned certifications being a precursor to a technical project's initiation, commenting that it was "Better to have these [certifications] before the project starts" (P11). There were various comments including statements that certain organizations required the participant to upskill per company policy while other participants had wanted to upskill and learn the latest techniques. As stated by Participant 1,

I think industry certifications are very important. They are quite often difficult to obtain and require constant "maintenance" to keep the qualification current. The ideal is to have both a tertiary qualification as well as industry certifications, along with experience. (P1)

Another participant stated, "Of course, I think it's very important… even if I didn't get such kind of certification myself, but I have learned some kind of courses that shared the right kind of knowledge for our project" (P12).

It was mentioned numerous times that, although not considered essential in their particular country, industry qualifications were highly regarded overseas, and that participants who had worked out of the country and held these qualifications had found it much easier to obtain work.

All participants who had held industry qualifications agreed that they felt more empowered to succeed in their roles with the knowledge gained and that when looking for other work, they were held in higher respect than their counterparts who did not hold any industry qualifications. Participant 2 confirmed that

I certainly agree that when I have been looking for new project management roles it has been much easier to get on to shortlists and receive job offers not only based on my previous experience but with strong and relevant industry qualifications. I found this particularly beneficial when I worked in England and found that it was a mark of immediate credibility and really assisted in allowing me to stand out versus other candidates. (P2)

Practical, Hands-On Experience Versus a Narrower Academic Approach

The question "How do you balance between qualifications and hands-on experience?" had varied answers, but in all of them, it was mentioned that experience was perceived as higher-rated than technical skills. Most of the participants (11/12) had held multiple project-related roles such as, Project Manager, Network Engineer, Software Engineer, Product Manager, and CEO. Some had initially started with no formal project management experience and had gained the skills predominantly through the various projects they had delivered throughout their careers. Participant 11 described this aspect as follows: "You need to supplement the theory with practice… at the end of the day it comes down to doing the work."

Participant 4 described their perspective as follows: When working with technical specialists who had little project management experience, they saw that the project was not running

smoothly, nor was it as successfully executed as when they were working with a project manager with more experience in running projects over a long period of time, even without a strong technical skill set. However, when comparing the feedback of more technically focused participants and reflecting on their experiences, they noted that they had experienced difficulties dealing with a non-technical project manager owing to the lack of understanding of what needed to be achieved from a technical standpoint. Participant 11 described this need further:

> *[Project managers] need to be able to communicate very effectively… with internal teams… and with stakeholders. They are able to talk the language you want them to talk… they understand IT concepts…They don't need to do the technical work, but they need to understand how things work. (P11)*

Required IT Project Manager Skills Perceived as Important

Table 2 shows that there were two skills that all interviewees agreed were important in a successful IT project manager working on a technical project: technical and communication skills. The next highest-ranking skills were relationship building, motivational-influencing, and leadership skills (considered important by 7 of the 12 participants). Next highest were analytical, financial competency and organizational skills (considered important by 5 of the 12 participants).

Table 2. Skills Required of an Information Technology Project Manager Considered Important by Study Participants

Skills	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	Total
Technical	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	100%
Communication	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	100%
Relationship Building	✓						✓	✓	✓	✓	✓	✓	58%
Motivational-Influencing		✓			✓			✓	✓	✓	✓	✓	58%
Leadership		✓			✓	✓		✓	✓	✓		✓	58%
Analytical	✓	✓	✓	✓		✓							42%
Financial Competency	✓		✓	✓		✓					✓		42%
Organizational								✓	✓	✓	✓	✓	42%
Critical Thinking	✓						✓			✓	✓		33%
Emotional Intelligence		✓								✓	✓		25%
Risk Management					✓						✓	✓	25%
Decision-Making	✓									✓	✓		25%
Stakeholder sense-making		✓									✓	✓	25%
Time Management				✓	✓								17%
Problem Solving		✓								✓			17%

Given the often highly technical nature of IT project management, participants stated that clear communication, whether verbal or written, was essential to ensure that all parties on a project could have a clear understanding of the direction and objectives to be achieved. "Communication skill… that's very important as many disagreements or confliction has stemmed from unclear communication" (P12).

Interviewees also confirmed that financial competence was perceived to be important as most IT projects run to a specific budget and project managers' adherence to this budget is one of the key

performance indicators on which they are judged. Participants confirmed that there had been massive cost overruns resulting from IT projects they had been involved in. “A lot of project managers… don’t have financial foundations. Understanding whether something is CapEx or OpEx when talking to others is so important” (P11).

One participant had recently hired an IT project manager to help implement a cloud-based IT system in a medical organization. They stated that hiring someone who had an IT degree but also a decade-long career in project management allowed the company to really excel. This project manager was able to give technical skills training to all staff who needed it and help them to transition to the new software platform while also discussing technical details with the new software vendors.

Interestingly, only two of the 12 participants saw time management as a vital skill. This finding may be due to the impact of complexity and uncertainty inherent in IT projects and perhaps also to the iterative cycles inherent in the adoption of agile approaches to project delivery. However, this finding was unexpected given the prominence of managing time, planning, and scheduling as first principles in first-order project management (see Saynisch, 2010). IT projects commonly exhibit high levels of uncertainty, complexity, and technical novelty, which challenge the value of upfront schedules and make detailed time-based plans fragile. Under such conditions, adaptive decision making and iterative cycles receive greater practical attention than time-based scheduling (Aghileh et al., 2024). Agile methods emphasize such approaches seeking to deliver on complexity, as opposed to scope within a certain time, as might traditionally be seen in first-order project management. In agile approaches, teams sense and respond to emergent problems and changing technical requirements rather than simply following a pre-set timeline. Agile delivery approaches explicitly reconfigure how time is managed. Single long-range schedules are de-emphasized in favor of short iterations, continuous reprioritization based on feedback, and delivery of increments. At the team level, success is measured by cadence, learning, and customer value delivered rather than by adherence to measures of time established at the project outset.

Time management in highly technical initiatives effectively results in a role reconfiguration in that the project manager shifts the focus toward being a translator between business, stakeholders, and team-level development. They focus on technical mediation and become an enabler of engineering autonomy (Đajić et al., 2024). When this time management element of the project manager role is reconfigured, managing people, negotiating technical trade-offs, and maintaining credibility with engineers (skills grounded in technical expertise) may be weighed as more instrumental for delivery than hands-on time scheduling. Time management is not unimportant, but it is frequently superseded by capabilities that better reduce technical uncertainty and enable rapid delivery in volatile contexts.

Perceived Benefits of an IT Technical Skillset

When analyzing the responses from a majority of the participants (10 out of 12), one common theme emerged about the benefits of an IT technical skillset: namely that a project manager's technical knowledge was able to be implemented directly, independently of others' technical expertise, and was seen as a major advantage to the project's success. Participant 10 expressed this opinion as follows: “You don’t need to be a hands-on full engineer, but you should be able to understand what is being talked about.” When a project manager has an IT technical skillset, they are capable of better decision making as this expertise allows the project manager to know what is required in every part of the project whether it involved technical aspects, financial aspects, people, or process management. As Participant 11 noted, “It’s better to have these skills before the project starts rather than run into a wall and then realize you need to upskill.”

Not needing to rely on others’ expertise to determine the key elements of the project delivery meant that technical knowledge empowered a project manager to make decisions with some confidence. Participants in technical IT roles stated that IT project managers who had a high level of IT understanding found it easier to discuss important project details that a generalist project manager would not necessarily understand. As Participant 11 mentioned, “They are able to talk the language…

understand IT concepts… understand a more modern way of working." Participants believed that with a generalist project manager, significant time was wasted involving many people in identifying the complex aspects of the work needed. Also, with a generalist project manager, the meaning of a message could get lost. The project could then suffer because of misunderstandings of what work was actually involved or required to meet objectives. As stated by Participant 10, "Being technically multilingual… DevOps, databases, cloud architectures… if people are saying AWS, it's obvious you need to understand what that is."

Overall, when dealing with technical staff, a project manager who had technical skills was able to take control of the project without needing to get many extra technical advisors involved. This advantage was seen to help in cutting down on time and expense, bringing the project manager up to speed technically. As noted by Participant 2,

> *Technical ability is vital. Especially when the person is more interested in keeping the budget down than actually making decisions based on non-technical priorities. You can waste time bringing someone up to speed, which in some cases is as valuable as money. I have had suggestions for solutions from our IT project manager that resulted in a cheaper and better solution than our original ideas. (P2)*

Some participants described how technical skills could influence risk identification and prevention. For example, Participant 12 commented that "Because many risks are from technical implementation… from the technology itself, the technical project manager can find the technical risks or technical problems earlier… in a proactive way." Here, technical understanding directly informs when risks are seen and how early intervention occurs. This opinion was echoed by Participant 10, who commented that "You start seeing patterns… risks that others might not see." Thus, technical fluency enables early recognition of latent project risks that are not yet visible to others.

Technical Fluency as Boundary-Spanning

Technical competence for IT project managers was seen by participants as technical fluency that enabled boundary-spanning across technical and non-technical domains. This perception is found in the comment from P10 quoted above, which explicitly rejected the notion that project managers need to be software engineers: "you don't need to be a hands-on full engineer, but you should be able to understand what is being talked about." Similarly, as noted above, P11 emphasized the importance of being able to "talk the language," mentioning also that such project managers are able to "understand IT concepts, including foundational knowledge such as the software development life cycle."

Technical fluency emerges as a relational and interpretive capability rather than a discrete skill, allowing project managers to translate between stakeholder groups, engage credibly with technical specialists, and assist in making informed decisions about technical execution. This boundary-spanning function was seen to reduce translation friction and support coordination in complex project environments, positioning technical understanding as neither optional nor synonymous with specialist technical expertise, but seen as an enabling form of project leadership.

The IT Project Manager as Sense-Maker

A related theme positions the project manager as an organizational sense-maker within a technical project domain, responsible for interpreting ambiguity and guiding action in conditions of uncertainty. Participants described situations in which project managers needed their technical expertise to inform judgment, execute pattern recognition, and gain a contextual awareness of the project. P10 highlighted the importance of situational sensing and interpretive awareness, noting that effective project managers must be capable of "reading the room" and recognizing issues that may not yet be explicit. P11 similarly framed the IT project manager role as extending beyond immediate problem solving, emphasizing that strong project managers "are not just solving the immediate problem, but are instead thinking about longer-term implications and systemic effects."

Sense-making emerges as a form of cognitive and relational skill, involving the integration of technical signals, stakeholder dynamics, and project management knowledge. Participant 10 commented that "Sometimes you don't have all the engineers in the room, so you have to make sense of things yourself." This observation suggests a technical understanding that can substitute for absent technical experts, enabling decisions to proceed rather than stall for want of technical fluency. These elements position the IT project manager not merely as a coordinator of tasks or processes, but as an interpretive agent who helps teams and stakeholders understand what is happening, what matters, and how to proceed in complex and evolving project contexts. Thus, the IT project manager role can be conceived as a boundary-spanning sense-maker, rather than simply a controller or technical specialist.

DISCUSSION

The mix of respondents allowed multiple views and different perspectives on the research question *To what extent is technical expertise required of an IT project manager?* The first area examined was whether there were any differences between those with and without higher education and whether these differences influenced participants' views on the importance of higher education for those involved in IT project management.

The findings highlight a divergence in how technical expertise is perceived by IT professionals depending on their educational and experiential backgrounds. While some respondents emphasized generic interpersonal and leadership skills, others saw technical competence as essential for project success. These findings reinforce and expand on the previous literature that acknowledges a need to define technical skill requirements for IT project managers.

Those with a less technical non-tertiary education felt that soft skills, people management, leadership, and team management ability were more important. Of interest is that participants who had practical experience but no higher education believed that qualifications were not required to be successful, while participants with higher educational qualifications were adamant that it had helped them in the areas of discipline and problem solving.

Although there is no literature directly linking tertiary education with IT project management, Harvey states in an early paper (2000), that tertiary education is very important as it enhances knowledge, skills, attitudes, and abilities while also empowering students as lifelong critical, reflective learners. From this we might conclude that employers do have a preference for tertiary education and respect for graduates who have completed advanced levels of study.

Technical Skills as a Strategic Capability

These findings support our argument that technical expertise should be perceived not merely as simply a complementary skill set in IT project management but as a strategic capability. Interviewees consistently noted that a project manager with technical fluency was better able to interface with technical teams, identify and mitigate risks early, and reduce miscommunication and rework. This finding aligns with Moe et al.'s (2010) depiction of agile leaders as cross-functional communicators and Highsmith's (2009) argument for integrated technical awareness in project leadership roles. Interpreted through a socio-technical systems lens, participants' emphasis on technical expertise defines the project manager's role as an integrator of social coordination and technical decision-making. Technical fluency enables project managers to anticipate system-level consequences, mediate between human and technological constraints, and support collective sense-making across subsystems.

A strategic capability can be considered a bundle of skills, resources, and know-how enabling effective technology-oriented projects and transformations. Weritz et al. (2024), argued that there is an impact from such strategic capabilities on digital transformation success and firm performance. Their study explored technical skills in the context of strategic capabilities in digital transformation and found evidence that such strategic capabilities influenced digital transformation success. Awwad et al. (2022) established a link between dynamic capabilities, IT capabilities, and organizational agility in the

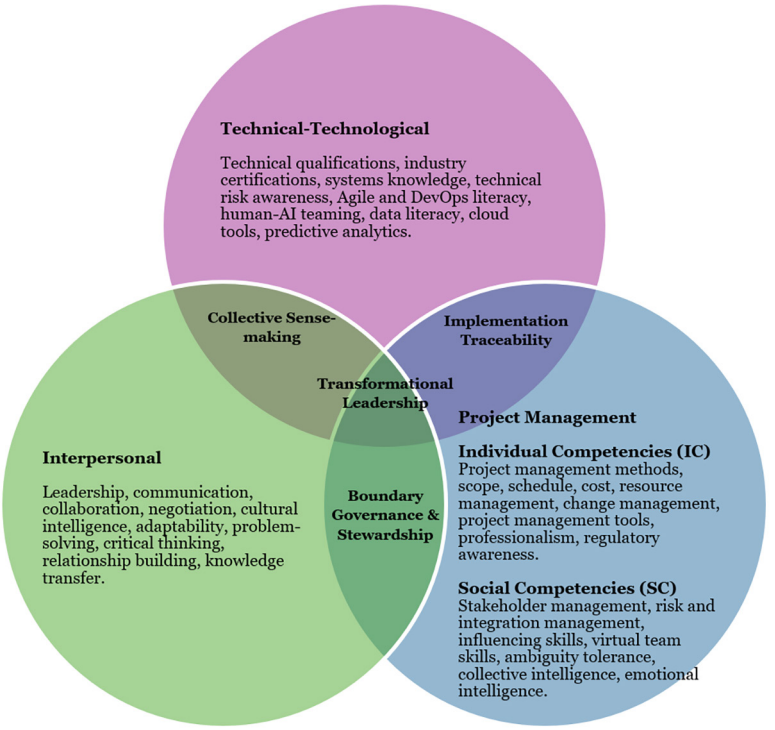
Jordanian IT sector, demonstrating how technical and IT capabilities mediated what was considered the higher-level capabilities (dynamic capabilities) and strategic project outcomes (agility). This finding supports the view that technical expertise and capabilities matter in the strategic chain, not just the project management knowledge set, combined with expertise in interpersonal and managerial skills. In their study of dynamic capabilities through the lens of project and portfolio management, Barbosa and Carvalho (2024) established a link between the skills created by project capabilities that were found to improve a company's performance. They found that project and portfolio capability represented 23.2% of the total dynamic capabilities found in their study sample. In support of this view, Ahmadi Eftekhari et al. (2022) saw the skills of managing technical tasks, technologies, products and systems as skills that addressed complexity in technical projects. De Rezende et al. (2021) made a similar observation about the competencies needed to manage complex systems in defense projects. These arguments define technical expertise not as an isolated skill or role requirement, but as a component of a broader strategic capability enacted through technical project management practice.

Therefore, there exists some risk that if non-specialist project managers are engaged, the project may go off track from a financial, leadership, technical, and implementation viewpoint simply because of the lack of technical experience and the lack of familiarity with a certain kind of project. This idea is also confirmed by Gamester's (2020) editorial on technical skills vs managerial skills, which stated that specialist technical project managers also have the ability to have an objective outlook, rise above the details, and create an atmosphere of technical credibility with their team members. Having an experienced IT project manager puts the expertise "in house," potentially negating the need for other specialist individuals to be engaged.

Strategic Capability Model for Technical Project Management

Synthesizing insights from the literature and empirical findings, this study proposes the strategic capability model for technical project management (SCM-TPM) as a conceptual model that explains how project managers operating in technology-intensive environments operate to deliver project outcomes. In this study, strategic capability is understood not as a senior-executive or organizational planning function, but as an integrated, project-level capacity that enables management of technical complexity, uncertainty, risk, and change. The SCM-TPM conceptualizes technical project management capability as emerging from the convergence and interaction of three interdependent domains: interpersonal capability, technical–technological capability, and project management capability. Rather than treating these domains as discrete or additive skill sets, the model argues that value in technical project management arises through their integration, producing managerial capabilities that support sense-making, coordination, decision making, and delivery in complex IT project contexts. This model is visualized in Figure 1.

Figure 1. Strategic Capability Model for Technical Project Management



The model positions capability across three interdependent domains, each representing a necessary and overlapping domain of practice. The domains are analytically distinct but non-hierarchical and are enacted simultaneously rather than sequentially in practice. Tier A, the interpersonal domain, encompasses behavioral, relational, and cognitive capabilities that underpin the project manager's ability to lead, coordinate, and influence diverse stakeholders. These competencies enable effective communication, negotiation, cultural adaptability, problem solving, and knowledge exchange. These functions are critical in socio-technical contexts, that are characterized by complexity, uncertainty, changing requirements, adoption of contemporary technologies and distributed collaboration. Tier B, the technical–technological domain, represents the domain-specific knowledge and technology-related skills that anchor the project manager's credibility and capacity for informed decision making. This domain includes formal technical qualifications, systems and architectural understanding, technical risk assessment, fluency in emerging digital technologies, data literacy, and the ability to engage collaboratively in human–AI teaming environments. Finally, Tier C, the project management domain, captures both individual and social project management capabilities. Individual capabilities include role-specific knowledge in planning, scope, cost, and quality management; resource and change coordination; and tool proficiency, while social capabilities encompass stakeholder engagement, integration management, influencing capabilities, virtual teamwork, emotional intelligence, and collective sense making skills. As presented in Figure 1 and Table 3, together the three tiers articulate a convergent model in which interpersonal, technical, and project management abilities are mutually reinforcing as a strategic capability, illustrating that effective technical project management arises not from isolated skill sets but from the integration of a fusion of capabilities that collectively enhance credibility, communication, and project delivery performance.

Table 3. Domains of the Strategic Capability Model for Technical Project Management

Tier	Domain	Key Elements	Selected Authors
Tier A	Interpersonal Domain	Leadership, communication, collaboration, negotiation, cultural intelligence, adaptability, problem solving, critical thinking, relationship building, knowledge transfer.	Ghobadi & Mathiassen (2020); Koi-Akrofi et al. (2024); Hedeman & Riepma (2023); Müller & Turner (2007); Highsmith (2009)
Tier B	Technical–Technological Domain	Technical qualifications, industry certifications, systems knowledge, technical risk awareness, agile and DevOps literacy, cloud project management tools, human–artificial intelligence teaming, data literacy, cloud tools, predictive analytics.	Cakmakci (2019); Win & Kham (2018); Koi-Akrofi et al. (2024); Müller & Turner (2007); Gamester (2020); Moe et al. (2010); Aghileh et al. (2024); Ahmadi-Eftekhari et al. (2022); Keil et al. (2013); Varajão & Takagi (2024); Lele et al. (2019); Alqahtani et al. (2024); Đajić et al. (2024)
Tier C	Project Management Domain Individual Competencies	Project management methods, scope, schedule, cost, resource management, change management, professionalism, regulatory awareness.	Hedeman & Riepma (2023); Sydow et al. (2004); Monson (2000); Project Management Institute (2025);
	Social Competencies	Stakeholder management, risk and integration management, influencing skills, virtual team skills, ambiguity tolerance, collective intelligence, emotional intelligence.	Riaz et al. (2017); Thorpe (2024); Pullan (2016, 2022); Cartwright & Yinger (2007); Rezende & Blackwell (2019); Ribeiro et al. (2021); Koi-Akrofi et al. (2024)

Within the model, the three domains of interpersonal, technical–technological, and project management are conceptualized as overlapping spheres of practice that jointly shape the capacity of technical project managers to operate effectively in complex technical environments. The model recognizes that the most consequential capabilities do not sit solely within each discrete domain, but instead emerge at their points of intersection, where hybrid forms of competence become actionable. Three intersection constructs of collective sense-making, boundary governance and stewardship, and implementation traceability capture these hybrid capabilities and articulate how interpersonal, technical, and managerial competencies converge to support effective project delivery.

Collective sense-making represents the intersection of the interpersonal and technical–technological domains, refers to the project manager's capacity to facilitate shared understanding across heterogeneous technical and stakeholder groups. In IT projects characterized by architectural complexity, emergent requirements, and high levels of ambiguity, meaning must be co-constructed through dialogic engagement rather than being dictated through documentation alone. Collective sense-making involves translating technical constraints into accessible narratives, eliciting tacit knowledge from engineering specialists, and enabling teams to jointly interpret system behaviors, risks, and dependencies. Through this capability, the project manager bridges cognitive and disciplinary divides, aligning diverse mental models so that technical decisions are understood, owned, and actionable across the socio-technical system.

Boundary governance and stewardship, positioned at the intersection of the interpersonal and project management domains, reflects the project manager's ability to negotiate, coordinate, and govern the boundaries between roles, responsibilities, organizational units, and stakeholder expectations. Modern IT projects routinely span organizational, professional, and cultural boundaries, requiring project managers to mediate competing interests, manage conflicts, uphold procedural integrity, and steward team learning and well-being under conditions of pressure and uncertainty. Boundary

governance thus involves interpersonal sensitivity (particularly emotional intelligence) negotiation, and the structured application of project governance practices.

Implementation traceability, the intersection of the technical–technological and project management domains, captures the project manager's ability to coherently link requirements, technical design decisions, testing activities, and deployment outcomes throughout the delivery life cycle. Whereas traditional project management emphasizes plan conformance, implementation traceability emphasizes alignment between outputs, outcomes and objectives, particularly in iterative agile, DevOps, and cloud–native environments where change is continuous. This capability requires both technical fluency (e.g., understanding architecture, code quality, automated testing, and integration constraints) and structured delivery management (e.g., backlog refinement, definitions of acceptance criteria, configuration management, and risk control).

At the center of the model sits transformational leadership, conceptualized as the integrative core that unifies and amplifies the hybrid intersection capabilities. Within the SCM-TPM, transformational leadership is conceptualized as a managerial capability that enables integration across domains, rather than as a separate leadership role or style. Transformational leadership enables technical project managers to articulate a compelling technical and organizational vision, inspire collective commitment, and foster a climate of learning, adaptability, and psychological safety. It provides the motivational, cultural, and ethical foundation for sense-making, stewardship, and traceability within projects in an IT context. By aligning teams toward shared purpose and a supporting culture, transformational leadership converts the diverse competency domains of the SCM-TPM into a coherent strategic capability. In doing so, it reinforces the model's central argument: that effective technical project management arises not from isolated technical or managerial skills, but from the integration of relational, technical, and organizational capacities under leadership that is developmental, future-oriented, and collectively empowering.

Unlike existing competency frameworks that catalogue skills by domain, the SCM-TPM explains how value in technical project management emerges through the integration of technical, interpersonal, and project management capabilities under conditions of uncertainty. Our contribution is not the introduction of a new theory, but the theoretical integration of socio-technical and capability perspectives to explain why technical expertise is central to contemporary IT project management practice.

Strengthening Technical Competence: Practitioner Recommendations

While Mantel and Meredith (1986) proposed some time ago that successful project management relied on technical credibility and the ability to use a systems approach, the interviewees in the present study reinforced this view, with several participants stating that technical expertise is a necessary qualification for an IT project manager, given the multi-layered complexities inherent in IT projects. Contemporary IT project management also requires grasping the significant fundamental shifts driven by the applications of AI. Martin et al. (2025), as an example, identified the need for further research on integrating AI-driven analytics into project management methodologies to improve forecasting, adaptability, and overall project success. Interviewees therefore offered the following recommendations for those looking to expand their career into IT project management:

- gaining a recognized and respected IT qualification;
- upskilling by obtaining industry certifications: PMP, PRINCE2, PM2, Disciplined Agile Development, Certified Professional in Managing AI, to become equipped with robust governance, risk, and delivery frameworks, and to integrate AI model development within standard project controls;
- obtaining a suitable role within a company with a focus on IT projects;
- joining industry groups to network and attend regular information seminars;
- identifying and working with an experienced mentor;

- (because of AI's impact on projects and teamwork) committing to a course of self-education to upskill in areas such as
  - AI concepts and architecture,
  - data literacy and governance awareness,
  - algorithmic risk and ethics competence,
  - AI-enhanced project management tools,
  - automation and workflow orchestration,
  - human–AI Collaboration and task redesign, and
  - change management for AI adoption.

Implications for Competency Frameworks and Practice

The study adds empirical support to critiques that point out the under-specification of technical proficiencies in many competency frameworks. Respondents considered project management certifications valuable for credibility and standardization, but insufficient to guarantee effectiveness without accompanying technical knowledge or experience. This finding suggests a need to evolve such frameworks to reflect hybrid competencies required in digitally intensive, agility-driven projects.

The study also offers potentially actionable insights for project management hiring and training practices. For roles in highly technical project environments, selection criteria should include demonstrable technical expertise or domain knowledge, in addition to traditional project management competencies. Training programs could be enhanced by incorporating technical upskilling pathways for aspiring IT project managers.

While the findings provide insight into the convergent competencies required of project managers on a technical project, it is important to note that the study is exploratory in nature and is based on a small sample. Interpretations of the results should keep in mind that the analysis reflects aggregated practitioner perspectives rather than role-specific comparisons.

CONCLUSION

The present study explores the extent to which technical expertise is required of IT project managers. Through semi-structured interviews with professionals across various technical and managerial roles, it became clear that technical fluency was seen to significantly enhance project management effectiveness in IT contexts. While general competencies like communication and leadership remain essential to project delivery, the ability to understand and contribute to technical discussions was seen to empower project managers to lead with greater authority, reduce delays, and improve outcomes. The SCM-TPM is offered as a conceptual explanation of how technical project management capability is integrated and enacted in technology-intensive project environments.

Current frameworks and certifications acknowledge the importance of technical competence but stop short of specifying what it entails. This study contributes to exploring that gap by offering grounded perspectives from practitioners. We propose that future frameworks consider the development of domain-specific technical skill maps. Doing so will help align educational, professional, and organizational expectations and ultimately lead to improved project outcomes.

Limitations

The SCM-TPM is proposed as a sensitizing model rather than a predictive framework. It is acknowledged that the sample of twelve interviewees is small and therefore the comparison of data is limited. Identifying participants for the study was challenging given the often highly confidential nature of technology-driven projects. Future research employing multi-role sampling and mixed-method designs could further validate and extend the proposed model.

Future Research Directions

Building on the findings, several areas warrant further investigation. Comparative studies of IT project manager competency expectations across regions should be conducted. Longitudinal studies could also examine how technical skills correlate with project outcomes across different IT domains. Studies could execute empirical mapping of the minimum technical knowledge required at various project phases (e.g., initiation, development, deployment). Research into effective upskilling strategies and learning pathways may also be of benefit for non-technical project managers transitioning into IT contexts. Finally, empirical review and validation of the SCM-TPM would be beneficial to further refine its affordance in an IT project management context. These lines of inquiry will further refine our understanding of hybrid technical–managerial roles and help ensure that future project management practice is fit for purpose in a rapidly evolving digital world.

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