

글로벌 IS 프로젝트 관리 역량에 관한 연구

김 경 민[†]

이화여자대학교 경영대학 경영학전공

A Study of Project Management Capability in Global Information System Projects

Gyeong-min Kim[†]

Professor of Information Systems College of Business Ewha Womans University

글로벌 IS 소싱이 확산됨에 따라 다국적 팀원들로 구성된 글로벌 프로젝트 팀이 급격히 늘어나고 있다. 상이한 시간대에 위치한 팀원 간의 상호작용이 필수적인 글로벌 프로젝트는 이러한 시간적, 공간적 복잡성 때문에 프로젝트의 성공적 수행에 많은 어려움을 겪고 있다. 본 연구는 성공적인 글로벌 프로젝트 수행에 필요한 프로젝트 관리 역량에 대한 탐색적인 연구 조사를 하고자 한다. 본 연구는 글로벌 프로젝트 관리 역량을 정보 기술적 역량(IT capability)과 인적 자원 역량(human resource capability)의 관점에서 고찰하였다. 연구 결과에 따르면 기술적 역량으로는 팀원 간의 조정 및 지식 공유 등을 지원하는 협업 도구(collaborative tools)가 프로젝트 성공에 중요한 역할을 하고, 인적 자원 역량과 관련해서는, 기존에 중요시 여겨지던 기술적 지식들 보다는 경영학적 관리 지식 및 의사 소통 능력 등이 중요시 여겨지는 것으로 나타났다. 인적 역량의 관점에서, 본 연구 결과는 해외소싱이 활발해 짐에 따라 프로젝트 관리자(Project Manager, PM)들이 가져야 하는 주요지식으로 기존의 기술적 지식의 비중은 급격히 줄어든 반면, 의사소통 능력, 해외개발 인력관리, 소싱전략 등과 같은 관리에 대한 지식과 비즈니스 업무지식이 점차 중요해 지고 있음을 보여주고 있다. 한국의 해외 소싱은 매우 초기 단계에 있지만 본 연구는 차체에 한국의 IT 인력 특히 PM 인력들이 갖추어야 하는 지식요건과 해외소싱을 관리하기 위한 기술적 역량 등에 대한 방향을 제시하고 있다는 점에서 의의가 있다.

Keywords : Global Project, IS Offshoring, Project Management Capability, Information Technology Capability
Human Resource Capability

1. Introduction

Recently, Information System (IS) offshoring has been increasing as efforts to reduce costs associated with IS services or (and) to have access to human resources. Offshoring IS services began in the early 1990s when US companies offshored to India, for conversion services of custom-made software pro-

grams for various operating system (O/S). Once the conversion service were successful, an increasing number of IT tasks were serviced from abroad, including applications management, applications development and help-desk support. As companies gain more experiences with offshore services, the complexity of the tasks that they are contracting is increasing as well. Companies open subsidiaries in developing countries to source

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[†] 교신저자 gkim@ewha.ac.kr

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IS services for their mother company as well as to provide services to other companies in their own country or others. Alternatively, companies offshore IT services to one or more independent companies at offshore location(s) by contract.

Increasing demand for IS offshoring leads to the growth in the number of global project teams scattered around the globe. Project team members include both mother company and offshore companies. A significant number of outsourced projects fail because of complexities associated with multiple sites and time zones. The biggest challenge is to integrate teams from different cultures and different time zones. The development of a common understanding about the project, motivating to reach common goals, rewarding diverse project teams are challenging tasks and require project management leadership. Other reported causes of failure are associated with massive costs and schedule overruns, which costs companies millions of dollars. A lack of understanding about the complexity of a global project results in unrealistic project planning and cost estimations by the project manager. The schedule and cost overruns are also attributed to errors in partner selection and management. In a domestic project, poor project management leads to problems. In an international setting, poor project management can doom the project. Previous research consistently indicated that project management capability is the most important factor in determining success.

The objective of this research is to identify global project management capabilities including information technology capabilities as well as human resource capability. While the technical infrastructure capability is related to the network, application and technology configurations required to manage global IT projects [4], the human resource capabilities are related to the knowledge and skills of the IT personnel to manage global IT projects [6, 4, 15]. Weill [34] stated that two firms investing equal amounts in technical IT infrastructure will most likely have different organizational results since the human infrastructure influenced the manner in which the technical infrastructure is converted into productive outputs. First, for IT capability this research identifies information technology used in global project management. Second, for human resource capabilities, this research will identify the critical knowledge required for project managers to perform such activities. Most of the studies regarding knowledge requirements for project managers were technical. Yasin et al. [32] and Kerzner [19] argue that project managers in international settings need to know both technical and non technical aspects of project management such as leadership skills and cultural sensitivity.

2. Research Framework

2.1 IT capability

For project management, communication and coordination among project members are critical for success of the project. When project members are in close proximity, meetings and socialization are used for communication and coordination. However, in global project management, temporal and spatial barriers prohibit frequent use of meetings and socialization. Thus, IT-based tools such as IP phone, e-mail, video conference and CASE (Computer Aided System Engineering) tools have critical roles in communication and coordination.

In global projects, communication among team typically starts as the Project Manager sends the project specifications to team members in offshored locations. Sufficient communication regarding the system requirements ensures the quality of the program. Depending on the task, the extent of coordination between members can vary substantially. At one extreme, the members may have minimal coordination requirements to achieve their goals. At the other extreme, coordination requirements can be extensive, and thus continuing mutual adjustments between members are required. For a simple coordination, a common messaging system is sufficient. For a richer communication, videoconference technology is the best route as it allows virtual teams to access and share the knowledge of remotely located members [8]. At the heart of communication and coordination is the transfer of knowledge. The types of knowledge transferred between project members (headquarter and offshore sites) include project specification, project status knowledge, project experiential knowledge, quality management knowledge, development standards knowledge and company culture knowledge [3, 10, 24].

In addition to the tools mentioned above, CASE (Computer Aided System Engineering) technology was found to be critical in representing knowledge regarding process and project contents in global software development projects [3]. Through the standardization of methods, diagrams and tools in CASE facilitate communication among project members [31]. The standardized project management method as well as project documentation in CASE such as Project Workbook allow project members to communicate effectively [31].

2.2 Human resource capability

As important as project management is, numerous studies

have attempted to identify the knowledge requirements of project managers. Identified areas of knowledge and skills are as follows:

- General Management Knowledge
- Project Management Knowledge
- Communication Skills
- Leadership Skills
- Global Knowledge
- Technical Knowledge
- Technical Management Knowledge
- Business Functional Knowledge

2.2.1 General Management Knowledge and Project Management Knowledge

General management knowledge requirements for project managers are well documented in the public domain [17]. General management knowledge and skills provide a foundation for project management skills [29] including : (1) ability to deal with ambiguity; (2) ability to be sensitive to organizational culture/politics; (3) ability to be self-directed and proactive; (4) ability to resolve disagreements; and (5) ability to delegate to team members [26].

Project management knowledge is concerned with setting clear goals and objectives, allocating resources to achieve them in efficient manners, and making commitment throughout the project. Specifically, the project management knowledge is associated with defining the followings [2, 9, 31] :

- (1) project goals and requirements,
- (2) activities to be performed for each phase of system development,
- (3) deliverables to be produced for each phase,
- (4) resources and time requirements for each phase,
- (5) tools and standards used for each phase,
- (6) responsibilities of the project members.

Sharing the project goal among members, having a clear project plan, allocating adequate resources, and making commitments are critical for success [18]. Based on common and shared goals and plans, the teams generate a high degree of focus and goal accomplishment [13].

2.2.2 Leadership Skills

Project managers take a role not only as a manager but also as a leader in global IS project. Kotter articulated the definition

of management and leadership. While management is about coping with complexity by planning, budgeting, organizing, staffing, controlling and problem solving, leadership is about coping with change by setting a direction, aligning people and motivating inspiring [25]. The role of global IS project managers are supposed to be 'management', but dynamic working environment with the nature of complexity and unpredictability of global IS project requires for them to have leadership.

Since global project teams are made of members coming from diverse backgrounds, more effective leadership is required. It is becoming more and more complex in today's multi-cultural team environment and is characterized as accomplishing tasks and considering employees [1]. Leadership that is based on promises, rewards for good performance, and penalties for poor performance is called transactional leadership. In contrast to transactional leadership, transformational leadership is characterized as charismatic, considerate, intellectually stimulating. Charismatic leaders are characterized by energy, self confidence, determination, intellect, verbal skills, and strong ego ideals. Individualized consideration is characterized as coaching skills, preference for two-way, face-to-face communication, and willingness to delegate.

2.2.3 Communication Skills

Defining user requirements and system architecture require frequent and effective communication between project stakeholders (i.e. users and the analyst and among team members) [7, 18, 23, 28]. During communications, application knowledge, quality management knowledge and development (standards) knowledge [25] are transferred among stakeholders. In international IS projects, effective communication to transfer that knowledge is critical for success [25]. To effectively transfer knowledge internationally, advanced communication skills of project managers and members alike are essential. A previous study [20, 21] on French IS offshoring to Mauritius, Africa shows that the quality of the project outcome depends on the quality of communication among members. The following describes how communication in international IT project takes place:

- (1) Project managers in France send project specifications offshore.
- (2) Team leaders in the offshore site study the project description and estimate the number of developers and the timeline.
- (3) The programming team develops and tests the program. According to the team leader, she needs to have good

communication with the project leader in France to produce good quality products. To ensure that the required knowledge is transferred across the organizational boundaries, project managers require verbal and written communication skills. In fact, the results of one study showed that 'poor communication' is ranked 4th contributing factor in reducing the effectiveness of the project manager [35].

2.2.4 Global Knowledge

Global knowledge refers to knowledge about offshore locations such as cultural knowledge. Kirkman et al., [22] indicated that while people in collectivistic cultures accept their pay based on team performance, people in individualistic countries consider pay based on team performance to be unfair. In collectivistic cultures, people are hesitant to be a team leader and to give direct feedback on each member's performance [22]. In addition, Kirkman [22] indicates that people with high power distance (i.e. high acceptance of power inequalities) in collectivistic culture tend to resist to self-management work team (SMWT) where each team member has more autonomy than traditional team settings.

SMWT in doing-orientation (i.e. employees tend to value work more than other activities) are willing to work more than teams in being-oriented (the opposite of doing orientation). Teams in being-oriented may resist change that requires more work for teams. Project managers must be aware of the cultural orientation of the team members before taking actions such as hiring, designing evaluation and compensation. Failure to do so means less satisfied, less committed, less motivated team, less productive, and less cooperative. Other global knowledge include knowledge about political, economic and legal systems, data security and regulations of offshore locations [14].

2.2.5 Technical, Technical Management and BusinessFunctional Knowledge

Technical knowledge includes knowledge about communication, CASE and project management tools mentioned above. In addition, knowledge about the operating system, database, network and programming languages are included in this category. While technical knowledge emphasizes specialty knowledge on Information Technology (IT), technical management knowledge is concerned with how to deploy IT to meet the strategic objectives of the business. How well IT is aligned with business remains one of the top issues in IT management [16, 23]. Thus, technical management knowledge of project managers is perceived to be critical to success. According to

Lee [26], technical management knowledge requirements for project managers included (1) ability to focus on technology as a means, not an end; (2) ability to understand technological trends; and (3) ability to learn new technologies.

As IT projects are perceived as solutions to business problems and a means to achieve business objectives, not only technical management knowledge but also the business functional knowledge of project managers are considered to be important in understanding the business problems and objectives. Business functional knowledge requirements for project managers include the ability to learn about business functions and environment.

3. Research Methods

This is a revelatory case study. A revelatory case study in multiple case format is appropriate for studying emerging and complex phenomena, where little and no previous research had been undertaken [33]. According to Eisenhardt [11], a priori specification of constructs based on extant literature helps to design case research and to link the data to be collected to the questions of a study [11]. Based on previous research on infrastructure capabilities and project management, the research framework is derived. Using this framework, multiple case studies on global project management are performed. The case data were collected from various sources including face-to-face interviews followed by questionnaires, company publications and various trade publications. Questionnaires were prepared to collect human resource capabilities in each case.

4. Case Description

4.1 DM

DM is a 20-year-old document management company with revenues of 2 million US dollars annually. The revenues are growing rapidly at a 100% annually. Its clients include government as well as commercial companies such as Bloomberg, Boeing, Lockheed Martin. While its headquarters are in New Jersey, the offices are scattered internationally such as the Philippines, Europe, India and Sri Lanka. DM's business is summarized as follows : (1) document management service-help publisher print contents in digital formats; and (2) technical writing-develop technical manual and e-learning. The client's

objectives to work with DM are cost reduction, access to experts and focus on core business. The average duration of a project is one year.

The sales cycle of the firm is as follows : (1) sales team of DM contacts client to initiate a project; (2) an initial team is formed to prepare SOW (Statement of Work) containing a solution to the problem, budget and timeline is prepared; and (3) once DM wins the project, a project manager (PM) is assigned by program manager (program manager has various projects to manage). PM recruits team members from resource pool (including various offshore locations). A team can be composed of members from multiple locations-onshore, near shore and offshore-depending on expertise. A local project manager is assigned. Under the local PM, usually there are multiple teams. Each team has a maximum of 6 people. While the program manager takes care of the client, billing and budget, the project manager deals with daily operations, scope and time. A chain of commands consists of a program manager, project manager and local PM.

During the initial stages of the project, virtual meetings and on-site visits are made for couple of weeks to obtain requirements from the client. To ensure quality, essential functions such as analysis are done by team members in the US to be close to the clients. Once the requirement analysis is finished, the PM goes to offshore facilities (such as Philippine) to explain the analysis results.

To discuss various issues on the project, bi-weekly meetings with the clients are performed using various technologies such as SharePoint and Netmeeting. A choice of technology depends on what the client possesses. Messages from the Client PM are forwarded via a provider PM or directly notified to the local PM through Issue Management Systems. IM (Instant Messaging) is used for urgent issues. The issues discussed via IM, should be entered in Enterprise Issue Management System (EIMS) for document purposes. EIMS is a confidential proprietary system and ensures the issues are registered and resolved.

It is important for team members to understand the definition of deadline, requirements, relationships between tasks, impact of individual task on others. Weekly status meetings (explain all these), visits to the site once every quarter is done. Video Conference, SharePoint, MS project, e-mail, phone, MS Excel are used as well.

A vice president of the company indicated the importance of human resource capabilities at a five-point Likert scale, ranging from strongly disagree (1) to strongly agree :

Even though other sets of knowledge cannot be ignored, general management knowledge was emphasized as a critical

Skills	Importance
General MGT	4.2
Project MGT	3.73
Technology MGT	3.67
Leadership	3.55
Communication	3.5
Business Functional	3.5
Global Knowledge	3.5
Technical Knowledge	2.29

weapon for global IS project managers. It also suggested that project managers should be trained to be able to apply project management methodology flexibly depending on the situation of project. Considering global IS project has its own purpose to reduce time and cost, realistic project planning and cost estimations have always been a challenge for the project manager.

4.2 AO

AO is one of the leading IT companies with revenues of 5,855 in EUR million in 2007. The company provides full-scale IT services ranging from consulting, system integration, managing services for IT infrastructure to Business Process Outsourcing (BPO). It has 50 locations around the world. The company is also an IT solution provider for Olympic Games covering Athens 2004, Torino 2006, Beijing 2008, Vancouver 2010 and London 2012.

Recently, the Dallas team worked on SAP HR implementation for its client. During the project, the team was collaborating with AO India. While system design, such as report design, is performed in the US, system development is typically done with team members in India, Brazil, Ireland and Poland. This reflects AO's follow the sun strategy to provide 24x7 customer support. According to an interview with a team leader in SAP HR project, AO wants to fully utilize the company's 100,000 people's potential instead of working like 1000 companies of 100 people.

During the SAP HR project, AO India performed the interface development with a third party (such as health care providers). Interface development with a third party was required to handle transactions between the AO's client and the third party. For example, when new employees are hired, client organization must send employee files to the third party health care provider. This interface development task is sent to AO India. Report modification is required as a part of the custom-

ization of standard SAP packages for client organization. While performing these tasks, U.S. team and India team extensively use SharePoint, a browser-based collaboration and document management platform. It allows team members to create shared workspace that allows them share and search documents. It also accesses the schedules, contacts and other information. In the case of report modification, the team leader in U.S. sends PowerPoint slides with a link to SharePoint. Within PowerPoint, he explains how the report should be presented. Then, all the files necessary to complete the task will be loaded in the SharePoint for the Indian employees.

They also used e-mail. The heavy accents of offshore team members led to miscommunication. Time zone differences made phone calls and conferencing tools challenging. E-mail mitigated the problems associated with language barriers and time zone differences.

The team leader of SAP HR project indicated the importance of human resource capabilities at a five-point Likert scale, ranging from strongly disagree (1) to strongly agree :

Skills	Importance
Communication	5
General MGT	5
Project MGT	4.818
Business Functional	4.667
Global Knowledge	4.667
Technology MGT	4
Leadership	3.909
Technical Knowledge	3.824

Clear communication skills and general management knowledge were considered to be critical for global IS project. Project management knowledge was also emphasized for realistic project planning and cost estimations. Compared to DM, AO emphasized business functional knowledge since the main business of the company involves introducing the enterprise technology such as ERP system and best practice associated with the technology.

5. Conclusions and Future Research

This study found that IT capabilities for global project management includes e-mail, video conferencing, Netmeeting, Instant

Messaging, wired and wireless phones, MS projects, MS Excel, SharePoint, proprietary systems, such as DM's Enterprise Issue Management System (EIMS). Continuous communications occurred among project team members. Traditionally, all of the communications in project management--deadlines, requirements, relationships between tasks, impacts of individual tasks on others-- must go through either the project manager or team leader. While most of the IT capabilities support this top-down approach, a collaborative tool, such as SharePoint, supports both top-down and bottom-up approaches. SharePoint is an emerging technology capable of reminding team members of deadlines as well as allowing team members to collaborate and share information efficiently. The emergence of SharePoint in global projects indicates that the success and quality of the project relies on horizontal communication and effective knowledge sharing among team members scattered internationally.

Future study is called for 'fitness of use' for each of the IT capabilities according to the characteristics of the projects. Fitness of use refers to products or services with features that users need [12]. When applied to IT capabilities in global project management, fitness of use can be represented as how IT infrastructure possesses the features that project members need.

Most of the studies regarding knowledge requirements for project managers were technical. However, this study showed that technical knowledge is the lowest in terms of importance while the general management knowledge and communication skills are the highest for DM and AO, respectively. For both DM and AO, general management and project management knowledge are shown to be important knowledge. Even in global project management, general management and project management knowledge are considered to be more important than global knowledge for both DM and AO. The reason is attributed to the interviewed project leaders being Indian. The companies seem to be aware of the importance of global knowledge and appoint employees with global background to the project leadership position.

Leadership skills showed a relatively low score across DM and AO. This may be because team members of technical projects are homogeneous, and their characteristics are autonomous focusing on task and diligence. Therefore, less stimulation is required through leaders. Business functional knowledge and technical management knowledge were rated as equal to or above 4 in AO. However, in DM, business functional knowledge and technical management knowledge were rated 3.5 and 3.67, respectively. Since AO projects are enterprise reengineering projects, business functional and technical management

knowledge seem to be important for business and technology alignment. However, DM projects (document management project) on smaller scales than AO and focuses on automation rather than business reengineering. Future research must focus on the importance of skills according to the types of projects being managed. More technical projects but large scale projects, such as telecommunication software development projects, might need different human resource capabilities than business application projects discussed in this study.

Companies in the United States and Europe are increasingly adopting IS offshoring. In France particular, companies have taken their IS services to offshore locations such as Mauritius, Tunisia, Romania, Russia, India and China. The services offshored include not only IS development but also IS-based business services in Sales/Marketing, Accounting/Finance, Human Resource and Customer Care [30]. IS offshoring in Korea is in its infancy, and thus the importance of global project management is less recognized. An increasing number of Indian programmers are coming to Korea to provide IS services. In addition, Korean companies are working with Indian or Chinesebased partners. For success in global project management, it is important to know the requirements of project management capability. This study provides guidelines to form globally focused project management capability, and thus will assist companies that plan to offshore IS services either as a provider or client.

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