Competency Development Workshop for Bridge Managers in Global R&D Projects

Nawarerk Chalarak, and Naoshi Uchihira

Abstract—**Competency development is a practice for developing specific competencies for particular purposes to improve job performance of individuals. The manager competency development becomes more important as managers are facing more challenges and higher expectations under the increasing complexity of global R&D projects. This study aims at designing a competency development workshop for bridge managers who facilitate research collaboration in global R&D projects. This study proposes a workshop method to gain advantages of intensive discussion and knowledge sharing between participants to develop competencies. The workshop consists of a case scenario, group discussion, and competency assessment questionnaire. Three participants indicated differences in their prioritization by using the analytic hierarchy process to compare priority of competencies between before and after the discussion session. The results suggest that participation in the workshop may influence the opinion of managers about the importance of different competencies. This activity could be considered as a method for managers to develop crucial competencies for facilitating global R&D projects.**

Index Terms— *global R&D project, bridge manager, competency development, workshop.*

I. INTRODUCTION

GLOBAL R&D projects become more complex and difficult to manage as they involve multidisciplinary research fields and the advancement of technology. Research activities in the project require intensive care from management. R&D bridge managers (BMs) are employed to bridge the gaps between headquarters and foreign R&D teams in global R&D projects. BMs face difficulties when facilitating research collaboration between two sides. Specific competencies are needed for BMs to solve difficulties and to work effectively in the projects. Especially, in the increasing business competition, BMs help their company to achieve strategic goals by possessing competencies to solve difficulties in global R&D projects. However, competency development takes time, and the managers cannot catch up with the growing demand of global R&D management. Traditionally, the competency development of BMs takes some time and highly relies on on-the-job experience.

The project manager competency development framework (PMCDF) developed by the project management institute (PMI) is an established and well-known framework of competency development for managers for a broad application [1]. This kind of framework provides definition, assessment, and development of competency. Organizations can adapt PMCDF to suit their requirements and organizational context. The organizations can utilize a workshop based on PMCDF to assess existing competencies and develop the required competencies of managers [2, 3]. It is possible to apply the competency development workshop in the context of global R&D projects to assess and develop the competencies of BMs.

This paper aims to propose a competency development method for BMs by using workshop in which participants engage in an intensive discussion about crucial competencies for facilitating global R&D projects. This method highlights the importance of individual interaction to exchange knowledge. Based on the analytic hierarchy process (AHP) results, we found that the BM's decisions regarding importance of competencies for solving difficulties in facilitating global R&D projects have changed after participated in the workshop.

II. BRIDGE MANAGER COMPETENCIES FOR FACILITATING GLOBAL R&D PROJECTS

A. Difficulties in Global R&D Projects

Multinational companies establish R&D subsidiaries in foreign countries to gain access to sources of specialized knowledge and expand their markets. The foreign R&D subsidiaries conduct research in collaboration with headquarters in the home country to achieve strategic goals of the organization. Researchers from different organizations work together in global R&D projects to exchange knowledge and information intensively. R&D investigates into a particular topic in order to improve understanding of established knowledge, especially basic research which acquires new knowledge without a predefined goal or target application of the knowledge [4]. R&D projects are prone to the uncertainty of outcomes and complexity of the process. Global R&D projects have additional challenges as project members have diverse cultural backgrounds and work in different physical locations [5]. Project members work across space, time, and organizational boundaries to accomplish interdependent tasks.

The managers in charge of global R&D projects confront more challenges to manage the projects which involve team members from different organizations and their communication mostly relies on technology-supported tools [6]. In the case of large projects in which R&D activities are more complicated, dedicated managers are necessary for facilitating research activities. Bridge managers (BMs) play

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an important role in global R&D projects for team building, eliminating gaps between headquarters and foreign R&D subsidiaries [7], and decomposing R&D requirements and assign them to project members in R&D subsidiaries [8]. BMs encounter difficulties in facilitating global R&D projects, including quality control, research approach guidance, requirement clarification, and team communication [9] as summarized in Table I. The difficulties cause unsatisfactory outcomes, delay in a project progress, and impact the project performance and the competitive advantage of the company.

TABLE I
DIFFICULTIES OF BMs WHEN FACILITATING GLOBAL R&D PROJECTS

Difficulty	Description
Quality control	Teams at headquarters and foreign R&D teams have different outcome expectations.
Research approach guidance	Foreign R&D teams conduct research using approaches that do not align with the business strategy of headquarters.
Requirement clarification	Tacit and subjective elements of requirements are difficult to transfer and to be fully understood by foreign R&D teams.
Team communication	Misunderstanding and insufficient communication between teams at headquarters and foreign R&D teams.

B. Competencies of Managers

Competency has been defined as knowledge, skills, abilities, attitudes, and characteristics that help individuals to perform their tasks effectively [10]. Dulewicz and Higgs [11] identified three dimensions of leadership competencies, including intellectual dimensions, emotional and social dimensions, and managerial dimensions. They argued that the relationship between leadership styles and the organizational context is important because there is no single solution for effective performance. The three leadership styles are engaging (focus on producing radical change through engagement and commitment), involving (focus on significant change of business model or way of work), and goal-oriented (focus on the delivery of clearly defined results in stable context). Prior studies found that the competencies of managers associate with project success [12]. In particular, managerial and emotional competencies play a significant role in influencing projects success [12]. This relationship could help the company to develop a project improvement model where the increasing capability of managers can lead to the increasing success of project implementation.

In the case of global R&D projects where BMs play a crucial role in facilitating research collaboration, it is important for BMs to possess particular competencies to solve specific difficulties and facilitate research activities effectively. Global R&D projects have dynamically changing situations, and researchers from different organizations involved. BMs may have to regularly adapt their leadership styles and develop competencies. The competency development method is important in this regard to support BMs for their competency development. Competency development does not mean only training, and leadership competency development can be done using activities outside work; on the job and experiential learning are important rather than attending training courses [13]. For BMs, the activities outside work and experiential learning are limited as they work with diverse teams across distances. Moving to and staying in different locations are costly.

III. BM COMPETENCY DEVELOPMENT WORKSHOP

A. Workshop Design

Workshop is a meeting where a group of people engages in intensive discussion on a particular subject [14]. The BM competency development workshop is designed for BMs to develop their competencies for facilitating global R&D projects by taking advantage of intensive discussion and knowledge sharing between participants. The workshop has three main components, including a case scenario study, discussion about difficulties in global R&D projects and competencies for solving difficulties, and competency assessment using a questionnaire.

The case scenario is prepared for workshop participants. This document describes situations in a global R&D project and identifies key problems related to the difficulties of BM in facilitating research activities in the project. This case scenario was reviewed by an experienced manager who took BM role in global R&D projects. It was revised based on feedback and suggestions from the manager. In the case document, first, the case describes detail of a Japanese multinational company which has R&D units in several foreign countries, including India. The company assigns a manager to a global R&D project and asks him to take care of research collaboration between headquarters in Japan and foreign R&D subsidiaries in India. This global R&D project consists of two parts, radical R&D and incremental R&D, in which the manager faces several difficulties when facilitating research collaboration. After reading the case scenario, participants should be able to understand how the BM works in global R&D projects, how researchers and engineers of headquarters and foreign R&D laboratories work together, and have an idea about difficulties of facilitating global R&D projects. This case scenario is a basic information for participants to discuss in the following step of the workshop.

In addition to the case study and discussion session, a questionnaire is developed to assess the opinion of participants regarding the importance of competencies for solving difficulties in global R&D projects. The questionnaire has three main sections, including introduction and explanation of difficulties in global R&D projects, importance of competencies for solving difficulties, and demographic information of participants. Participants are requested to answer the same questionnaire at two different occasions, before and after the discussion session.

The questionnaire utilizes AHP method helping participants to indicate the importance of several competencies by comparing two competencies at a time. The pairwise comparison is a fundamental concept of AHP. In this research, AHP helps participants to prioritize competencies that help them solve difficulties in global R&D projects. In this case, there are seven competencies as AHP options for solving difficulties in global R&D projects [15]. The seven competencies are adopted from prior studies in leadership competency [16] as shown in Table II. The AHP model is depicted in Fig. 1.

TABLE II
COMPETENCIES FOR SOLVING DIFFICULTIES IN GLOBAL R&D PROJECTS

| Competency	Description
Knowledge management	Ability of leaders or facilitators to elicit and integrate knowledge from different cultures [17, 18].
Perception (self-awareness)	Ability to understand their own emotions, strengths and weaknesses, needs and drives, sources of frustration, and reactions to problems. Capability to manage emotions and to control their impact in the workplace environment [19, 20].
Resilience	Ability to have consistently in different pressing situations and adjust their behavior accordingly; recover from stress, adjust to stressful occasions, and behave above the norm regardless of stress or adversity [11, 21].
Decision making	Ability to get information, judging the quality of things, services, or people [22].
Understanding worldwide business environment	Ability to obtain a worldwide perspective and to combine worldwide diversity necessary for multinational firms [23, 24].
Learning foreign cultures and customs	Ability to interact with people from diverse cultures at the same time and adjust to living in foreign cultures; conscious of, appreciation, thoughtful, and adjusting to cultural differences [23, 24].
Communication skills	Ability to communicate directions and vision to staff, adapt communication styles to the interest of audiences, and use communication styles to inspire audiences [11].
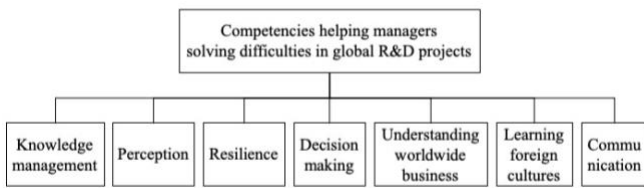
Fig. 1. AHP model included seven competencies helping managers solving difficulties in global R&D projects.

After answering the questionnaire for the first time (before discussion session), participants are invited to participate in the discussion session to share their opinions regarding the case scenario and their experience in global R&D projects. Participants are asked to identify competencies for solving particular difficulties indicated in the case scenario. The researcher facilitates this discussion session and answers questions raised by participants. In the case scenario, participants are asked to assume that they are the BM who in charge of research collaboration and face several difficulties in the global R&D project. They have to think about solutions to solve difficulties, then think about competencies that could help them to accomplish those solutions. A worksheet is provided for all participants to record their individual opinions during the discussion. In addition, there is one worksheet that participants record information from brainstorming and agreed by all participants. This aims to encourage deep discussion and intensive knowledge sharing between participants. After the discussion session, participants are requested to answer the same questionnaire as before the discussion session again. Fig. 2 shows the worksheet for participants to use during brainstorming and discussion.

B. Data Analysis

The AHP method is adopted to analyze the questionnaire data. In the initial stage of this research, data were collected from three participants who have experience in global R&D projects of Japanese companies. Their information is shown in Table III. Participants compared the relative importance of pair-wise competencies at a time, and entered their judgements. The AHP results show different priorities of competencies (for solving the same difficulties) before and after the discussion session. Table IV shows top three competencies that help participants to solve quality control difficulty.

Worksheet for BM Competency Workshop

This worksheet is a supporting document for the BM Competency Workshop. There is one sheet to input information from discussion (Group sheet, all participants input together). In addition, each participant please input your ideas in another sheet (Participant 1, 2, 3).

Discussion Guideline
4 difficulties
1) Different priority to deliver outcomes (quality/time/cost)
2) Researchers do not fully understand customer needs
3) Quality standard is not defined clearly
4) Unbalance communication to support each other between two teams
7 competencies
1) Knowledge management
2) Perception
3) Resilience
4) Decision making
5) Learn foreign culture
6) Communication
7) Human resource management
3 steps thinking
Practical solution --> Abstract solution --> Competency
Example

	Practical solution	Abstract solution	Competency
Difficulty	Specific actions	General solutions	Ability, skills, or knowledge
Don't know the cause of a problem	Ask 5-Whys	Root cause analysis	Critical thinking
Increase revenue next year	Propose new product	Marketing strategy	Market knowledge

Please fill in your ideas/opinion in the table below

	Practical solution	Abstract solution	Competency
Difficulty	Specific actions	General solutions	Ability, skills, or knowledge
1) Different priority to deliver outcomes (quality/time/cost)			
2) Researchers do not fully understand customer needs			
3) Quality standard is not defined clearly			
4) Unbalance communication to support each other between two teams			

Fig. 2. A worksheet for the discussion session of the workshop. This worksheet provides a guideline for participants to share their ideas and information.

TABLE III
PARTICIPANT INFORMATION

Competency	Position in company	Years in current position	Collaborating countries	Age range
Participant 1	CEO	7	Korea, China, UK, France	20 to 30
Participant 2	Team member	9	China	31 to 40
Participant 3	CEO	15	Vietnam	41 to 50

Knowledge management skills and communication skills are included in leadership competencies of BMs to facilitate global R&D projects [16]. The results of the current study show that Participant 1 and Participant 2 recognized the importance of knowledge management skills, however, Participant 3 had a different opinion as Participant 3 highlighted the importance of communication skills.

TABLE IV
TOP THREE COMPETENCIES FOR SOLVING QUALITY CONTROL DIFFICULTY

Competency	Before discussion		After discussion	
	Competency	AHP weight	Competency	AHP weight
Participant 1	Decision making	0.39	Decision making	0.29
	Learning foreign culture	0.24	Knowledge management	0.24
	Communication	0.14	Communication	0.15
Participant 2	Human resource management	0.26	Knowledge management	0.28
	Knowledge management	0.23	Communication	0.27
	Learning foreign culture	0.20	Human resource management	0.20
Participant 3	Communication	0.29	Decision making	0.41
	Learning foreign culture	0.18	Communication	0.21
	Perception	0.15	Resilience	0.14

Participant 1 reported a significant change in the importance of knowledge management skills whereas Participant 2 recognized the importance of knowledge management skills before the discussion session. Fig. 3 shows the changes of importance (AHP weight) of knowledge management skills for solving quality control difficulty from three participants.
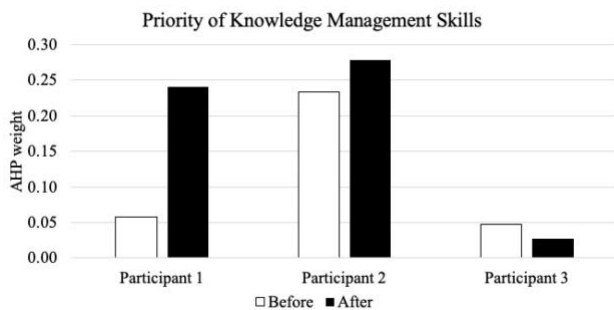

Fig. 3. Importance of knowledge management skills for solving quality control difficulty, before and after the participants participated in the discussion session of the workshop.

IV. DISCUSSION

The PMCDF is designed for project managers using in broad application [1]. Organizations should adapt the framework to suit their requirements and context. It is possible to develop this kind of framework for BMs who facilitate research collaboration in the global environment as a BM competency development framework (BMCDF). The BMCDF may include definition, assessment, and development of competencies which are customized to the context of global R&D management. This research suggests that workshop has the potential to be one of the competency development activities for BMs as the results show that participants changed relative importance of competencies for solving difficulties in global R&D projects after participated in the workshop discussion.

Given the increasing need for competent managers who facilitate global R&D projects [25, 26], this research examines the effectiveness of the training workshop in leadership competency development for BMs that included case study and intensive discussion in order for the managers to analyze their competency gaps and develop required competencies by exchanging experiences and knowledge with other managers. This process is likely to provide an effective method for BMs to develop competencies in addition to the on-the-job training or traditional lecture-based training.

This research is in the initial stage and collected data from three participants. We plan to conduct more workshops to collect additional data for further analysis. There are several limitations in the current research. First, we limited to the development of leadership competencies, whereas technical competency development may reveal different results. For example, only discussion in the workshop may not lead to a significant change in the priority of technical competencies which require practical training. Further, the data collected is cross-sectional, the workshop was conducted within a certain period of time. BMs may require longer time to understand and realize the importance of competencies when they facilitate global R&D projects and assess the results.

V. SUMMARY

This research aims to propose a competency development method for BMs in global R&D projects by using a BM competency development workshop. The initial results suggest that workshop participants changed the importance of competencies after having a discussion with other participants in the workshop. It is likely that participants have a better understanding of the difficulties in global R&D projects and perceive the importance of specific competencies for solving particular difficulties through intensive discussion and knowledge sharing. The results suggest that participation in the workshop may influence the opinion of managers about the importance of competencies for facilitating global R&D projects. This activity could be considered as a method for BMs to develop crucial competencies for facilitating global R&D projects.

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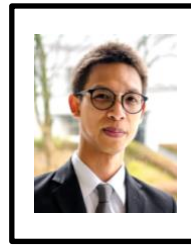
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