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Expertise Management in a Distributed Context

The Case of Offshore Information Technology Outsourcing

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Abstract. This paper explores the management of expertise in offshore outsourcing projects. While the study of expertise development and coordination gained some attention in recent years, much of this research has been on co-located teams. Little is known about the way expertise is managed in distributed contexts and the challenges distributed teams face when attempting to develop and share expertise. To address this gap this paper discusses the notion of expertise management and concludes that it consists of three key processes; namely, development, coordination, and integration. To illustrate the challenges involved in expertise management processes, an in-depth case study of an ABN AMRO – TCS outsourcing project is outlined. In this case study onsite and offshore teams developed, coordinated, and integrated expertise despite geographical distance, time-zone differences, and different local contexts. Evidence from this case suggests that this outsourcing project jointly developed expertise while coordinating and integrating expertise in a distributed manner. Finally, conclusions are made and implications for research are discussed.

1 Introduction

The offshore outsourcing of information technologies (IT) started in the 1990s, following an outsourcing trend in manufacturing industries. In recent years the scale of outsourcing projects has increased significantly as considerations involved in outsourcing to offshore locations has been extended from contemplating simple and repetitive tasks and processes to those that involve strategic and knowledge intensive activities [1] such as the development and implementation of strategic IT systems.

As outsourcing projects become complex and involve multiple stakeholders, the parties involved need to develop and access distributed expertise such as specialized skills and knowledge. Such capability, (the management of distributed expertise) is considered a key resource for software development [2]. Research has previously reported that experts from different companies and remote sites, specializing in multiple areas, have jointly engaged in sharing expertise in order to innovate and design new products [3]. While such evidence is valuable in understanding knowledge processes in distributed contexts, past studies have, so far, paid little attention to the processes involved in managing expertise in distributed contexts, in general, and in offshore outsourcing settings, in particular. Clearly, a successful software development effort depends on a timely and accurate coordination of expertise [2]. And yet, such expertise is often developed based on local routines for working, training and learning [4]. Furthermore, while solving problems, remote counterparts in offshoring projects are expected to integrate their knowledge and expertise and offer clients innovative ideas to transform their business [5].

Indeed, the study of the management of expertise is wide and diverse. Nonetheless, the vast majority of the studies on expertise management have tended to separate three key components essential for leveraging local expertise; namely, the development, coordination, and integration of expertise. Furthermore, past studies on expertise development have emphasized the role that knowledge creation plays in the development of expertise mainly in co-located contexts [6, 7], while studies on expertise coordination tended to emphasize the role that information plays in bringing together expertise in the form of directories that map out the pool of expertise available within the organization [8]. Considering expertise development processes separately from expertise coordination activities may result in an incomplete theoretical construct that does not explain how knowledge creation activities relate to the cataloging of where expert knowledge lies. To address this gap this paper seeks to link expertise development, coordination, and integration activities by exploring how the knowledge created during expertise development activities is cataloged and made available in the form of a cataloging system that offers pointers to "where knowledge lies." Furthermore, in developing, coordinating, and integrating expertise, globally distributed teams seek, on the one hand, to develop a distributed mode of expertise management to allow the emergence of expertise in remote locations so work can be divided based on the availability of local expertise. And, on the other hand, globally distributed teams may consider a joint mode of expertise development in which the entire global team may benefit from the collective experience embedded in the team. We explore the development

of expertise and the coordination of knowledge through a cataloging system by considering either a joint or a distributed approach of expertise management.

Following this introduction, this paper explores the concept of expertise and the theoretical foundation of expertise development, coordination, and integration. This conceptual contribution is followed by an in-depth case study of an offshore outsourcing project in which expertise was managed onsite and offshore. The paper concludes by providing theoretical and practical implications.

2 Understanding the Concept of Expertise Management

Expertise is defined as the ability to act *knowledgeably* within a specific domain of application [9]. Expertise is also often referred to in the literature as *know-how and competence*, which is the ability to apply knowledge to develop and improve products and processes [10] or the ability to achieve skillful performance [11]. In a way, the concept of expertise is closely related to the notion of *knowing in practice* [11].

The concepts of expertise and knowledge indeed relate to each other; however, we maintain that they are not synonymous [12]. For one, we argue that expertise refers to a specific type of knowledge that is dynamic and evolving in nature. In this regard, embodied knowledge and skills possessed by individuals [13] represent the notion of expertise discussed in this paper. Such knowledge is accumulated over years of experience in a specific area. Furthermore, embodied knowledge is context-dependent [13]–situated in a particular setting [11]. Lastly, such knowledge is inseparable from the practice of doing. It is constantly evolving and changing through recurrent practice that involves varying activities and contexts.

In line with past discussions about the dispersedness of knowledge [14, 15], expertise at the team and organizational level is distributed. In this regard, recent years have witnessed further dispersedness of expertise [15, p. 1039]. For example, teams involved in outsourcing projects are often located onsite, offshore, and nearshore. This presents new challenges to the management of expertise as remote counterparts engage in creating and sharing context-dependent knowledge. At the same time, remote counterparts are expected to share and exploit knowledge in a fashion that brings expertise to bear in a timely manner [2] regardless of its origin.

A review of the expertise and knowledge management[1] literature suggests that the management of expertise consists of three major processes; namely, expertise development [6], coordination [2] and integration [16]. While each expertise management process has its distinct characteristics, the three processes depend on each other.

Expertise development involves the acquisition of know-how through learning. With this we mean that expertise is developed when members of a team engage in

[1] In reviewing knowledge management literature we focused on the literature that addresses embodied specialised knowledge and skills embedded in practice (i.e. fits our definition of expertise)

learning and problem solving activities to come up with new products and services. Such expertise can be developed through training sessions and formal education programs. At the same time, by being involved in a particular project, skills and expertise may potentially be enhanced as members of a team interact with their counterparts and confront and solve new problems. In this sense expertise development is the learning process through which individuals and groups develop skills, know-how, identity, and meaning to facilitate their participation in organizational activities.

Expertise coordination refers to team-situated interactions aimed at managing expertise dependencies [2, p. 1555]. In this regard, expertise coordination as a process ensures that individuals at each site have requisite know how and that they know who knows and does what. Therefore, expertise coordination attempts to achieve awareness of the existence of expertise and the alignment of expertise across various experts and tasks in the sense that task dependencies [17, 18] and expertise dependencies are addressed effectively. In this regard, coordination results in concerted awareness of dispersed expertise availability and could potentially enable employing expertise in a timely and accurate manner [2].

Expertise integration is the process that brings together the know-how, in an effective and efficient way, to develop new concepts and innovations. As opposed to expertise coordination that aims at creating awareness of existence expertise, expertise integration assumes value creation through cross-fertilization and interactions between experts [10, 16, 19]. Consequently, experts bring their know-how together (often expertise that is drawn from various disciplines and is based on years of experience) to innovate new concepts, products, and processes. In doing so, the integration of expertise attempts to address future needs (business transformation and innovation) rather than solving present problems (maintenance). In line with the literature on knowledge integration [20], the integration of expertise facilitates the organization's ability to sense, interpret, and respond to new opportunities and threats in a dynamic business environment [16].

There are several aspects relating to the characteristics of expertise and knowledge that affect a firm's ability to develop, coordinate, and integrate expertise. The following section discusses these aspects in depth and aims to identify challenges associated with the management of distributed expertise.

3 The Management of Distributed Expertise: The Dilemma and Its Implications

The management of expertise may face challenges that can be behavioral (lack of motivation [21]), managerial, and technological [22-25] in nature. In the context of a distributed environment, one dilemma could be imperative for the management of expertise; namely, whether to jointly or locally develop expertise. With this we mean that distributed teams can jointly develop expertise by incorporating the entire team in learning activities. On the other hand, distributed teams may pursue an approach in which the development of expertise will be distributed resulting in the

specialization of individuals and teams in a particular area. The first approach can be seen as a joint approach to expertise management, whereas the latter would be a distributed approach to developing expertise.

Table 1. Expertise Management: The Dilemma and Its Implications

	Expertise Development	**Expertise Coordination**	**Expertise Integration**
Joint expertise development			
Benefits associated with jointly developing expertise	- Creating common grounds for knowledge sharing. - Facilitating the development of a TMS (that spans beyond the boundaries of co-located).	- Ability to bring expertise to bear beyond a single co-located team by accessing information about "who knows what" and "who does what".	- Knowledge integration of learning generated in past and present projects through intensive formal and informal interactions.
Challenges of jointly developing expertise	- High investment in creating "common grounds" between remote counterparts. - Higher task dependency may result in miscommunications and in design problems. Duplications of existing assets that may result in "reinventing the wheel" - May create high cognitive load on individual team members.		
Distributed expertise development			
Benefits associated with separately developing expertise	- Higher specialization of teams in a particular area. - Avoiding the duplication of existing assets and "reinventing the wheel". Allow fewer dependencies between tasks.	- Because of fewer dependencies between tasks, there is less need to bring expertise to bear beyond the boundaries of a dispersed team. - A TMS can be created within co-located teams and therefore can be easily updated.	- Knowledge integration produces information that is relevant and directly contributing to the line of products and markets within this specific domain and market.
Implications of separately developing expertise	- Difficulties to exploit learning generated in remote locations or other knowledge domains. - An overview perspective of "who knows what" and "who does what" is mainly developed at middle management level. - Little knowledge integration between domains. To integrate knowledge between domains dispersed teams need to rely on well-defined interfaces agreed in advance.		

Taking either a distributed or integrated approach of expertise development may have implications for the coordination and integration of expertise. Coordinating expertise may require the development of an organizational memory system, known as the transactive memory system (TMS). Through this memory system individuals

can encode, store, and retrieve information about "who knows what" and "who does what" from codified and personalized directories (reference withheld for blind refereeing). Updating the directories of a TMS is critical for the coordination of expertise as experts may develop new skills and acquire recent information about markets and products. While the joint development of expertise may offer more opportunities to update directories about "who knows what" and "who does what" through interactions between remote counterparts, the investment in creating "common grounds" [26] for knowledge exchanges can be rather costly and problematic to achieve. Furthermore, a joint development of expertise may create unnecessary duplications of expertise across locations and impose information overload on individual team members [15].

The distribution of expertise, on the other hand, offers advantages in terms of division of work, which could offer fewer dependencies between remote counterparts and could prevent miscommunications between them [27]. Indeed, the diversity of perspectives and knowledge asymmetries may increase the global team capability to create new knowledge [15, 28] and enhance the quality of their decision making processes [29]. At the same time, such a distributed approach may result in fewer opportunities to share learning and may create difficulties to integrate expertise due to insufficient mutual understanding induced by team members having different interpretive frameworks and sets of expertise [15, 16, 28]. Based on these literatures, Table 1 summarizes the dilemma and the implications involved in a joint or a distributed approach to developing expertise.

In line with these observations, this paper seeks to explore the approach taken by distributed teams at TCS concerning expertise management and the challenges faced and solutions introduced to cope with the implications presented above.

4 Research Design and Methods

In line with past research [30, 31], a case study method was selected for this research. An in-depth case study of an offshore outsourcing project was carried out, and a qualitative, interpretive approach was adopted.

To explore the management of expertise in offshoring settings, our primary case selection criterion was to find an outsourcing project that was globally distributed and required the development, coordination, and integration of expertise. A key project of TATA Consultancy Services (TCS) was selected and studied in depth in the context of expertise management. This project involved the outsourcing of ABN AMRO IT infrastructure support and the development of new systems by TCS. The project faced complex and challenging expertise development, coordination, and integration activities between onsite and offshore locations. TCS's remote counterparts needed to transfer knowledge while learning about the client systems and engaging in co-development and implementation activities.

Evidence was collected from interviews, project documentation, and observations [30, 31]. Interviews were conducted at two remote sites: the onsite location in Amsterdam (The Netherlands), with TCS and ABN AMRO personnel,

and in Mumbai (India), at the offshore location with TCS personnel. Interviewees were included: (1) counterparts working closely at remote locations, and (2) diverse roles such as executives, managers, and developers. In total, 52 interviews were conducted. On average the interviews lasted 1.5 hours, and they were recorded and transcribed in full. A semi-structured interview protocol was applied to allow the researchers to clarify specific issues and follow up with questions.

Data analysis followed several steps. It relied on iterative reading of the data, using open-coding techniques [32], to sort and refine themes emerging from the data [33]. In particular, three themes that represent the concept of expertise management were carefully studied: development, coordination, and integration of expertise. Each process was examined in relation to a joint and distributed approach to expertise management. Statements that were found to correspond with these three themes were selected, coded, and analyzed using Atlas.ti, Qualitative Data Analysis software [33, 34].

5 ABN AMRO Bank-TCS Outsourcing Project: Expertise Management Processes

To understand the complexity involved in managing expertise across dispersed locations, we first elaborate on TCS and the challenges they faced in this project. Following this, the results of the case study will be presented.

5.1 ABN AMRO-TCS Outsourcing Project: Background

The ABN AMRO bank-TCS outsourcing deal was announced in late 2005. In this $1.2bn contract, The Netherlands-based bank contracted five vendors, among them Tata Consultancy Services (TCS), to provide support and application enhancement services. TCS provided these services in cooperation with another Indian company, Patni Computers, and Accenture was the preferred partner for application development. Facilities from TCS involved in the contract are located in Mumbai, Amsterdam, Luxemburg, and Sao Paulo.

The outsourcing project organization of the ABN AMRO-TCS deal consisted of onsite teams at the customer locations in Amsterdam, Luxembourg and Sao Paolo and offshore or nearshore teams at the global delivery centres of TCS in Mumbai, Hungary, and Sao Paolo. The offshore team's organizational structure was a mirror image of the onsite team's organization structure (apart from some minor variations in role names). Typically, team members resided in one location throughout the project, either onsite or offshore, while only a small number of individuals traveled between remote locations for short visits. The entire onsite team was made of project members, project leaders, portfolio managers, program managers, a transition head, a relationship manager, and other functions such as quality assurance, human resources, and organization development personnel. Members of the onsite and offshore teams worked together during the Transition and Steady State phases. In the Transition phase the onsite team learned about the client's systems and transferred

this knowledge to the offshore team. In the Steady State phase, mainly the offshore team, but also the onsite team, supported these systems as well as engaged in application development activities. This mode of work required the onsite and offshore teams to develop, coordinate, and integrate expertise. The following section describes the processes involved in managing expertise in this outsourcing project.

5.2 Expertise Development Processes at TCS

There are several domains within which expertise can be developed, such as, technology-orientated, business-orientated, and managerial-orientated expertise. We have observed that when it comes to technology- and business (market)-orientated expertise, TCS followed an approach that promoted a joint development of expertise at the project and the organizational levels. There were several processes and organizational mechanisms that TCS put in place to ensure that expertise was developed in a joint manner; a tightly managed knowledge transfer process between onsite and offshore teams, a global expertise management system, and a joint expertise development program.

The knowledge transfer process between onsite and offshore teams contributed to the development of technological expertise relating to client systems as well as better understanding of ABN AMRO business processes and environment. Members of the onsite and offshore teams jointly learned about client systems and acquired new knowledge regarding maintenance and problem solving concerning the IT infrastructure at the client site. A tightly managed knowledge transfer process between onsite and offshore locations during the Transition phase supported this learning activity. While the teams were distant from each other, processes and structures implemented by TCS ensured that the expertise developed onsite would be shared with the offshore location. For example, the offshore team was organized as a mirror image of the onsite team. This ensured that each offshore expert corresponded and learned from a particular individual who held the same role title in the onsite team. Furthermore, the learning between onsite and offshore teams took place through the application of standardized templates that captured the knowledge held by the client and transferred it to the offshore team. The codification of knowledge through the use of these standardized templates enabled the offshore team to examine and learn about technological aspects involved in supporting the client systems as well as to identify knowledge gaps that had not been properly covered by the onsite team. To ensure that expertise had been properly learned and absorbed and that the knowledge acquired could be appropriately (re)applied in problem solving scenarios, the offshore team “played back” the acquired know-how to the onsite team and solved problems generated by the client. Through such “play back” exercises, the onsite and offshore teams ensured that knowledge gaps, which were in fact the expertise deficiencies of either team, were detected and eliminated. In other words, the teams identified the areas in which expertise had been jointly developed as well as those areas that required additional joint expertise development.

While knowledge transfer processes between onsite and offshore teams enabled a joint development of expertise, other processes within TCS ensured that expertise would be developed in both joint and distributed manner. For example, training activities concerning specific technologies were offered to employees regardless of their geographical locations or association with a particular project or industry. Courses were mainly offered by the Global Learning and Development Group and could be taken on-line or by physically attending a module. In parallel, project leaders could identify an expertise deficiency in a particular area and could request an upgrade of the team's expertise-base to correspond with the level needed by the industry. Consequently, a tailored module that ensured the joint development of expertise in that particular area was offered to the team.

To summarize, expertise development at TCS mainly took place within the outsourcing project team during which the onsite and the offshore teams jointly developed the expertise that was required for future maintenance of the client's systems. Additional activities ensured that expertise was also developed in a distributed manner through training.

5.3 Expertise Coordination Processes at TCS

The coordination of expertise was required to find solutions and answers to either technological or business challenges that were not in the possession of the team. In such situations, team members started looking for the required expertise within their local or global project team or in the other projects. A successful expertise coordination activity often resulted in locating an expert that shared his or her know-how with the information seeker(s). Finding the most appropriate expert in a timely manner has always been a key challenge for dispersed teams. To achieve this, the coordination of expertise at TCS relied on two memory systems. One was a transactive memory system (TMS) that was created within a particular offshoring outsourcing project (between onsite, offshore, and nearshore teams) in which most individuals developed awareness of "who knows what" and "who does what."

The second memory system was a much broader memory system consisting of a corporate-wide Expertise Management System that was put in place and regularly updated by TCS to ensure that expertise could be brought to bear in a timely manner beyond the boundaries of an outsourcing project.

In the ABN AMRO-TCS relationship, as a result of the organization of the team (the mirror image), a cataloging system of the pool of expertise within the outsourcing project was developed.

The organization of the outsourcing project team, in onsite and offshore locations, as a mirror image using almost identical roles and titles for the offshore and onsite teams, created an expertise directory with regard to information about "who knows what" and "who does what." These pointers to expertise holders were created and constantly updated, during the Transition and Steady State phases, as remote counterparts continuously interacted with each other to ensure the joint development of expertise. For example, during a specific knowledge transfer

activity, onsite experts would create documents that captured the know-how involved in maintaining a specific system and would make this know-how available to their remote counterparts based offshore. In doing so, the onsite experts first created a pointer in the expertise directory to a particular area of expertise of which they possessed the required knowledge to maintain this system. Following the exchanges of know-how with counterparts from the offshore team, an update of the expertise directory, with regard to where such expertise lies, took place within the entire global team. In other words, through intensive knowledge exchanges between onsite and offshore teams, the types of expertise and their location within the teams were made transparent to the entire global team. The directory of expertise emerged as sets of documents and entries in databases (a codified directory) as well as information stored in people's memory about "who knows what" (a personalized directory). The codified part of this directory was implemented through a project portal accessible through the TCS intranet for members of the project team only. In collaboration with ABM AMRO, a dedicated TCS team created a Project Portal (internally called Knowledge Base) that contained links to all project and system documents created during the knowledge transfer phase. Furthermore, this Knowledge Base contained information about the experts involved in the project, their contact details, and other relevant information. At the time of data collection in Mumbai (June 2006), two TCS associates worked full time on development and maintenance of this system.

In addition, other processes were put in place at TCS to ensure that expertise could be brought to bear in a timely manner from outside the boundaries of an outsourcing project. TCS introduced a system, called Integrated Competency and Learning Management (ICLM), which coordinated expertise across the entire firm. TCS designed and implemented this system to manage employees' competencies, monitor skills adjustments, and offer learning modules and individual development programs according to future needs.

In addition to staffing individuals according to their skills, the ICLM system offered search capabilities for globally expertise available that could not be located through the project-based TMS. In this regard, at the organizational level, the coordination of expertise, in the sense of bringing specific expertise to a particular location in a timely manner, was carried out through the ICLM system. To ensure that the directories of the ICLM system were up-to-date, a dedicated team was put in place in India. This team monitored data entry, handled requests from TCS employees, and issued information to TCS employees about learning modules.

Another vehicle through which expertise was coordinated at TCS was a technical database of reusable components (code) stripped from confidential client data from various projects. A dedicated team checked the entries submitted to this database by individual team members, filtered these entries, and made sure that the most appropriate keywords were assigned to each entry. Individual team members, regardless of their geographical location and project association, who sought solutions to a particular technological problem, could access this database through TCS intranet and search for reusable components. While a reusable solution was the main the outcome of this activity, information seekers were also exposed to the experts who designed the components and were in possession of such expertise.

Therefore, remote counterparts could contact an expert for consultation prior to implementing a reusable component. Similarly, TCS developed a database that contained business history (a brief overview and lessons learned from past projects) that was accessible through the TCS intranet. Through this system team members could find information about projects and contact the individuals involved in these projects for advice.

In conclusion, at TCS the coordination of expertise within a specific outsourcing project relied heavily on the TMS developed during knowledge exchanges between onsite and offshore teams. The joint approach for expertise development of an outsourcing project facilitated expertise coordination processes because it exposed remote counterparts to experts located in other sites (onsite or nearshore). In this regard, within an outsourcing project, the coordination of expertise benefited from the joint expertise development approach pursued by TCS.

When it came to expertise coordination, between and across outsourcing projects, TCS introduced organizational mechanisms in the form of the ICLM system, technical and business databases that offer search mechanisms to information seekers and to ensure that needed expertise is made available in a timely manner.

5.4 Expertise Integration Processes at TCS

Joint development of expertise within ABN AMRO-TCS outsourcing project helped TCS deal with typical expertise integration challenges such as different mindsets and lack of understanding between experts. Interviewees claimed that TCS employees involved in a distributed outsourcing project developed a common understanding of specific systems, concepts, and terminology because of the structures, work practices, and the knowledge transfer process described above.

However, the sharing of learning beyond the boundaries of an outsourcing project and the integration of expertise across projects and domains still posed a challenge to TCS. Indeed, leveraging knowledge and expertise to develop new products and services required the facilitation of learning across functional areas, market knowledge, and various technologies that were globally distributed and sometimes remotely related. To tackle this challenge, TCS introduced various mechanisms to ensure that the know-how and learning generated in one project would be shared in other projects. One vehicle through which expertise was integrated at TCS was Centers of Excellence (CoEs). TCS introduced CoEs in several domains related to technologies–Windows-based technologies, Java-based technologies– and specific practices (market verticals) CoEs–Service Practice CoE, Financials CoE. These CoEs were networks of experts known for their advanced know-how and experience in a particular market or technological domain.

A key role for the CoE was to ensure that expertise and knowledge developed in one place would be re-applied in other projects. In this regard, the CoE facilitated the reapplication and integration of expertise almost from the beginning of the project by offering expertise and solutions developed in other projects and by connecting

experts in a particular field with the project team to advise them on best practices and approaches to carry out their outsourcing project.

There are other aspects of expertise integration in which a CoE engaged. For example, when projects did not apply best practices, members of CoEs made sure that the know-how required for the proper execution of an outsourcing project, according to TCS best practices, would be shared with the project team. In this regard, CoEs were responsible to acquire know-how from internal or external sources and share it with project teams.

Another mechanism that TCS employed, for expertise integration across technological and market verticals domains, was knowledge-exchange events and seminars that were organized on a regular basis in different geographical locations. For example, technological fairs were organized a few times a year at major TCS development sites (May 2006 in Mumbai). In this case, experts from different technological domains offered information about different aspects relating to the use and implementation of their technologies. This knowledge exchange event was organized in the form of a traditional trade fair in which TCS employees walked from stand to stand to learn and assess the applicability of existing solutions to their project.

To summarize, the integration of expertise at TCS took place at the project and organizational level. The integration of expertise at the project level relied on a TMS that had been developed and updated through intense interactions between remote counterparts. Indeed, the approach taken by TCS to jointly developed expertise, as described-above, supported the development of a TMS and offered more opportunities for members of the global outsourcing project to integrate their expertise. At the same time, new ideas and innovations were sought outside the boundaries of an outsourcing project through other vehicles such as CoEs, trade fairs, and training. While the use of external sources of knowledge in the form of CoEs is a distributed approach to expertise management, the TMS-based approach can be seen as a joint approach to expertise integration.

6 Discussion and Conclusions

The objective of this paper was to explore expertise management processes in distributed contexts. The case of the ABN AMRO–TCS outsourcing project illustrates the complexity involved in managing distributed expertise. For one, the management of expertise in such projects involves the coordination and integration of expertise that are both locally and globally developed. In addition, the case illustrates aspects relating to project and organization expertise that need to be coordinated and integrated. Similarly, expertise development at TCS involved knowledge codification processes as well as processes that encouraged the sharing of tacit knowledge. The following sections address these aspects starting with the summary of the findings presented above.

The evidence presented above suggests that TCS followed an approach in which expertise was developed both within and across projects. The company, though,

invested in supporting a joint approach to expertise development within this outsourcing project. We have learnt from interviewees that the approach taken in this project was applied in other projects at TCS. At the organizational level, TCS encouraged the development of expertise through training activities that upgraded the skill-base of TCS employees regardless of their geographical location. Through such training activities, expertise was also developed in a distributed manner.

In coordinating expertise, TCS has invested in activities that created a TMS within an outsourcing project through which onsite and offshore team members developed awareness about "who knows what" and "who does what." To support the coordination of expertise beyond the boundaries of an outsourcing project, TCS implemented an ICLM system and various mechanisms that offered search mechanisms for knowledge seekers and provided them with access to existing expertise and in-house solutions.

The integration of expertise was mainly evident at the organization level. One key vehicle, through which learnt lessons and insights were shared, was the CoEs. These networks ensured that outsourcing projects were aware of the latest know-how and best practices possessed by TCS. They also made certain that project skill-level was adequate to meet the outsourcing challenge. Expertise integration also took place within an outsourcing project; however, interviewees perceived intra-project expertise integration as limited in its scope. In this regard, CoEs were the forces behind incorporating cutting edge innovative ideas from the industry into project teams. Finally, data suggest that TCS followed an approach of jointly developing expertise within an outsourcing project while investing in upgrading distributed expertise. Consequently, as suggested by the data presented above, coordinating expertise at the project level required little effort from the outsourcing project team (onsite and offshore team members), while coordinating expertise outside the boundaries of a project entailed the application of various mechanisms at the organizational level. The integration of expertise, on the other hand, seemed to be significant at the organizational level, however there was with little impact at the project level. Table 2 summarizes the findings of this study.

Table 2. Expertise Management at Project and Organization Levels

	Expertise development	**Expertise coordination**	**Expertise integration**
Project	Joint developed expertise through tightly managed knowledge transfer processes between onsite and offshore teams and development of Knowledge Base.	A TMS that supports developing a collective awareness of "who knows what"	Expertise integration within an outsourcing project mainly meant reusing existing ideas. Limited in exposure to external innovations
Organization	Distributed mode of expertise development through on-line training and courses.	Information technologies in the form of technological and past projects databases and ICLM system that offered search mechanisms of existing expertise and experts.	Knowledge-exchange events and CoEs that brought in new ideas and innovations from other projects and the industry

Evidence from this case also suggests that interplay took place between the development, coordination, and integration of expertise. In particular, we propose that the joint approach to developing expertise between the onsite and the offshore teams resulted in the development and the update of a TMS [35] that stretched beyond the boundaries of a single team. Indeed, recent studies suggest that a TMS can be expanded within an organization through the application of information systems [8]. This study suggests that a joint development of expertise could, as well, result in expending the boundaries of a TMS as members of a global team encode, store, and retrieve information regarding their expertise through the use of databases, documents, and person-to-person interactions. At the same, we have observed that while the boundaries of such a TMS may have expanded beyond the onsite and the offshore team, the ability to coordinate expertise, beyond the boundaries of a single outsourcing project, is rather limited unless team members have used information systems, in the form of the ICLM system [36], and other search mechanisms to locate needed expertise. In this regard, the joint development of expertise is limited in its impact, and its influence on coordination activities is subject to the interactions among members of the organizations. Lastly, evidence suggests that the integration of expertise does not necessarily rely on the joint development of expertise. Rather, it is driven by the organization's capacity to bring in new ideas through the use of networks of experts. In this regard, the joint development of expertise may, in fact, limit possibilities for expertise integration as project teams would prefer to implement practices developed locally [4] than adopt suggestions made by a network of experts who are not part of the project. To overcome this challenge, TCS gave

experts from CoEs the power to evaluate the level of expertise possessed by the outsourcing project and authorized the implementation of best practices regardless of local practices developed by project teams.

6.1 Implications for Researchers

To summarize, evidence suggests that TCS pursued a hybrid approach to expertise development, in which both a joint and distributed approach to expertise development were carried out, and through which the coordination and integration of expertise were supported through intra- and inter-project knowledge integration mechanisms. Our findings confirm observations made by past studies that distributed teams have applied both joint and distributed approaches to expertise development. Yet, this study contributes to the relevant literature by considering the project and organizational levels as two stages within which expertise development can be carried out in a different manner. Indeed, as evidence suggests, TCS pursued a joint approach to expertise development at the project level while developing expertise in a distributed manner at the organizational level.

There are other aspects relating to the management of expertise rising from the ABN AMRO-TCS outsourcing project. For example, the joint development of expertise appeared to rely on the codification of know-how captured by the onsite team. Indeed, evidence suggests that the codification of knowledge, and the documentation of knowledge acquired during knowledge exchanges among onsite and offshore teams, is imperative for creating a knowledge base of expertise needed to maintaining the client's systems. Furthermore, the process of codifying knowledge created a terminology accepted by both onsite and offshore teams concerning the processes and the technologies involved in maintaining client's systems [37]. Lave and Wenger (1991) described in length the practice-based approach to developing expertise. In particular, Lave and Wenger emphasize in their study how expertise is transferred from an expert to a novice (for example, the case of midwifes). Such practice-based processes required the participation of newcomers in activities, problem-solving, and organizational activities through which they gain the know-how required to perform their duties, assume more responsibilities, and gradually shift from the periphery to the center of doing within a team or an organization.

However, our case illustrates a rather different approach to developing expertise in which project members codified the know-how required for carrying out their duties, minimized face-to-face interactions, and relied on standardized procedures when learning about client's processes and technologies. This observation raises the following question: Why does expertise development at TCS present a rather different approach than observed in the relevant literature [6]?

We suggest that distributed teams, such as the TCS outsourcing project team, as opposed to co-located teams, invest in creating the pointers to know-how necessary to carry out specific activities rather than in learning and absorbing the know-how necessary to successfully execute these activities. While past studies mainly focused on the process through which knowledge is created during expertise development

processes [38], we suggest that the expertise development processes described above can also be seen as a process through which individuals create information about the location of the know-how and expertise necessary to execute a particular activity. Since in a distributed team interpersonal exchanges as a source of expertise development proves difficult, these teams ensure that expertise can be coordinated when needed and that the pointers to the knowledge are known and can easily be accessed by the entire team. Through the use of standardized templates, documents, and a tight knowledge transfer process, this TCS outsourcing team has indeed built a cataloging system in which pointers to where knowledge and expertise reside was made available to the entire team. In this regard, our findings contribute to the literature on expertise development by considering information processes as part of the process of developing expertise.

6.2 Implications for Practitioners

For practitioners, the evidence presented above raises a question about the preferred approach to managing expertise in the sense of a distributed versus a joint approach to developing expertise. We propose that, on one hand, a distributed approach to expertise development may encourage the exploration of new ideas and acquisition of cutting edge knowledge within a globally distributed project. However, such an explorative approach could produce a distributed expertise-base that is troublesome to map out and manage and result in inabilities to coordinate expertise in a timely manner. On the other hand, pursuing an approach that relies on a joint approach of expertise development may result in the development of an expertise system that is exploitative in nature. As observed in this case, members of an outsourcing project could easily access each other's expertise and bring expertise to bear in a timely manner. However, such an approach can be overly exploitative, lacking innovative ideas to transform the clients' and the vendors' businesses. We propose a hybrid approach, in which the management of expertise encourages the exploitation of expertise, within globally distributed outsourcing projects, and yet explores the development and integration of expertise from external sources of knowledge, to overcome the dilemma presented above. Depending on project characteristics, a shift in emphasis on joint versus distributed expertise development might be appropriate. Such characteristics include the similarity of clients' businesses thus justifying investments in cross project mechanisms and the level of turnover in the vendor teams.

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