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BO Yang

*School of Information, Renmin University of China, yangbo\_ruc@126.com*

Yuzhu Li

*School of Information, Renmin University of China*

Chunhan Zheng

*School of Information, Renmin University of China*

Hua Jin

*Charlton College of Business, Umass Dartmouth*

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# The Influence of Boundary Spanning Capability on Cultural Differences--Multi-case Study from Vendors' Perspective

Yang Bo<sup>1,†</sup>, Li Yuzhu<sup>2</sup>, Zheng Chunhan<sup>3</sup>, Jinhua<sup>4</sup>

<sup>1,3,4</sup>School of Information, Renmin University of China

<sup>2</sup> Charlton College of Business, Umass Dartmouth

**Abstract:** Most offshore IS outsourcing projects were failed. Communication and coordination problems caused by cultural differences between clients and vendors are important reasons. The theory of boundary spanning capability provides a new theoretical perspective for research of coordination and communication mechanisms between clients and vendors. In this paper, we chose three vendors focused on software testing to investigate the influence of boundary spanning capability on cultural differences. We found that high boundary spanning capability can reduce the influence of cultural differences, and improve the success.

Keywords: boundary spanning capability, offshore outsourcing, cultural differences, outsourcing success

## 1. INTRODUCTION

With the promotion of globalization, more and more services have been distributed worldwide and provided by service providers from the entire world (Mithas & Whitaker, 2007)<sup>[1]</sup>. Offshore IS outsourcing projects, a kind of important global business activities, are playing an important role and getting more attention (Carmel & Tjia, 2005<sup>[2]</sup>; Dibbern et al., 2004<sup>[3]</sup>). Now the growth rate of offshore IS outsourcing per year has reached 20%, but almost 65% are failed (Moore, 2004)<sup>[4]</sup>. Coordination and communication problems between clients and vendors caused by culture differences are important reasons (Dibbern et al., 2004)<sup>[3]</sup>. It produces a serious of problems that how to overcome these boundaries, reduce risks, and manage offshore IS outsourcing projects successfully (Krishnan et al., 2008)<sup>[5]</sup>.

Boundary spanning capability establishes and implements cross-organizational seamless information flow (Vilvovsky, 2009)<sup>[6]</sup>, including boundary spanner, boundary objects, and boundary spanning process (Gopal, 2009)<sup>[7]</sup>. Boundary spanners refer to individuals who ensure the required knowledge is able to flow across the boundaries (Levina & Vaast, 2005)<sup>[8]</sup>. Boundary objects are the “common language” for consistent understanding of information between clients and vendors (Vilvovsky, 2009)<sup>[6]</sup>. Boundary objects are plastic enough to adapt to local needs and constraints of several parties using them yet robust enough to maintain a common identity across sites. Boundary spanning process can be considered to be standard for boundary spanner and boundary object to span boundaries (Levina & Vaast, 2005)<sup>[8]</sup>.

As a kind of cross-cultural, cross-organizational capability, Levina introduced boundary spanning capability into offshore IT/IS service outsourcing, which is a sort of cooperative behavior of cross-border transactions and offshore operations. All these brought new opportunities for both of theory development of boundary spanning capability and industry development of offshore IT/IS service outsourcing. However, the construct of boundary spanning capability has always been not clear enough. Recent researches have different understandings of boundary spanning capability, especially in the field of offshore IS outsourcing, its concept, essence, content and construct are undefined.

On the other hand, most of recent studies were proceeded from clients' perspective to find out how to

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<sup>†</sup> Corresponding author. Email: yangbo\_ruc@126.com

enhance supplier management, promote communication and improve project success rate. The vendor perspective has been much less studied (Levina & Vaast, 2005;<sup>[8]</sup> Feeny et al., 2005<sup>[9]</sup>). China represents an understudied setting (Jarvenpaa & Mao, 2008)<sup>[10]</sup>, researches from vendors' perspective to enhance boundary spanning capability and eliminate cultural differences in offshore IS outsourcing are urgently needed.

## 2. LITERATURE REVIEW

Prior research has examined multiple concepts associated with boundary spanning capability, including boundary object, boundary spanner and boundary spanning process (Gopal, 2009)<sup>[7]</sup>. Boundary object originated in fields of social science research, and is always used to solve problems in collaboration between heterogeneous discipline organizations (Star et al., 1989)<sup>[11]</sup>. Boundary object can be divided into four types (Carlile, 2002)<sup>[12]</sup>: repositories (e.g. database), standardized forms and methods (e.g. engineering change table), objects or models (e.g. computer simulation), maps of boundaries (e.g. flow chart). There are three properties of effective boundary object (Carlile, 2002)<sup>[12]</sup>: representing, establishing shared grammar for individuals to represent their knowledge; learning, providing specific methods for individuals to describe and study difference that spanning specific boundaries and dependence; transforming, providing processes and methods for individuals to transform knowledge between projects.

Recently, the concept of boundary spanning capability, especially boundary object, has been applied in many different environment and fields, such as design team field (Henderson, 1991<sup>[13]</sup>; Subrahmanian et al., 2003<sup>[14]</sup>), new product development field (Carlile, 2002)<sup>[12]</sup>, and financial system field (Briers & Chua, 2001)<sup>[15]</sup>. Some researchers applied it to fields of closing knowledge gaps and promoting knowledge transformation (Levina & Vaast, 2005;<sup>[8]</sup> Mark et al., 2007<sup>[16]</sup>).

Boundary spanners "facilitate the sharing of expertise by linking two or more groups of people separated by hierarchy, location, or function" (Levina & Vaast, 2005)<sup>[8]</sup>. Boundary spanners in practice may be nominated or may emerge without nomination (Levina & Vaast, 2005)<sup>[8]</sup>. Existing researches (Levina & Vaast, 2005)<sup>[8]</sup> have shown following aspects of boundary spanning process: how to start boundary spanning process, rules of electing boundary spanner, rules of designing and using of boundary object, feedback of boundary spanner to boundary object, adoption of boundary spanner to boundary object, promotion of boundary spanner to boundary object.

In addition, some scholars began to study impact on success of offshore IS outsourcing project in perspective of boundary spanning capability (Krishnan et al., 2008;<sup>[5]</sup> Vilovsky, 2009<sup>[6]</sup>). Gopal & Gosain (2009)<sup>[7]</sup> used quantitative method, which is used rarely in researches of boundary spanning capability, to discuss impact of boundary spanning capability on performance of software outsourcing project. They considered boundary spanning capability synthetically from three perspectives: boundary object, boundary spanner and boundary spanning process. They provided a basis for measurement of boundary spanning capability. However, the research was organized based on organizational control theory, and boundary spanning was included in the research model only as control variables. Further research is needed to investigate the direct influences of boundary spanning capability on outsourcing success.

Dibbern et al. (2004)<sup>[3]</sup> proposed that some "extra cost" occurred in software offshore outsourcing projects, leading to failures of the projects. He said that factors causing the project cost increase were related to vendors' business comprehension, geography gap and culture differences between clients and vendors. Hofstede's theory of culture differences dimensions decomposed culture into factors that were easily to recognize, and proposed a specific theoretical framework based on specific research data. Drawing upon Hofstede's organization culture criterion, Rai et al. (2009)<sup>[17]</sup> evaluated culture differences between onshore clients and offshore vendors, and divided culture differences between organizations as the following: process-oriented to result-oriented,

employee-oriented to work-oriented, orientation of organization loyalty to orientation of business loyalty, open system to closed system, loose control to tight control, normativism to pragmatism(rules-oriented to customer-oriented) and so on.

Many researches show that culture differences have negative effects on communication between clients and vendors(Dibbern et al.,2004)<sup>[3]</sup>. However, studies on how to eliminate such negative impact remain limited. Boundary spanning capability provides a new perspective to investigate how to eliminate the impact of cultural differences between offshore IS outsourcing projects, and moreover, past research on boundary spanning often focused on the perspective of domain knowledge or knowledge transfer, overlooking the perspective of cultural differences.

### 3. RESEARCH METHOD

Data collection took place during the summer of 2012 and involved case studies in three software testing service outsourcing vendors in Beijing, China. We choose multi-case study method here.

Case study research is appropriate in situations where the research question involves a ‘how,’ ‘why,’ or exploratory ‘what’ question, where the investigator has no control over actual behavior events, and where the focus is on contemporary phenomenon. The research presented in this paper fits all of these three criteria. The method is used in a natural environment to investigate the phenomenon, solving problems that both causality and motivation are not clear. It is usually used to analyze and deconstruct complicated theories and concepts as well.

#### 3.1 Case selection

The three vendors in Beijing were selected for three reasons.

First, Beijing is one of the 21 “services outsourcing base cities” in China and the leader in the Chinese offshore ITO market with a market share of 40%. Second, we decided to select all the cases from software testing outsourcing. All of the projects are from the same outsourcing industry, which can help our research control the differences of cross-industry.Third, we have chosen three vendors with different market, different size, different business domains and different management styles, which provide comparable evidence to our findings.

#### 3.2 Data collection

Data collection in this research has three steps. First, the main work was literature review and collection of secondary data, such as related literatures about boundary spanning capability. Second, including choice of interviewed companies, communication with person in charge in each company, and face-to-face interviews with staffs in different level. During the third step, our team interviewed related staffs in these companies deeply according to analysis of the second step. The duration of site visits was one or two working days. We then compared our notes, check the records and combined a consolidated version. The gathered secondary data mainly include company websites, news releases, and various company reports.

**Table 1. Interviewees’ job title**

Vendor	Positions
A	Department Director, Testing Leader, Testing Engineer
B	Project Manager, Testing Leader, Testing Engineer
C	Divisional manager, Testing Manager, Testing Engineer

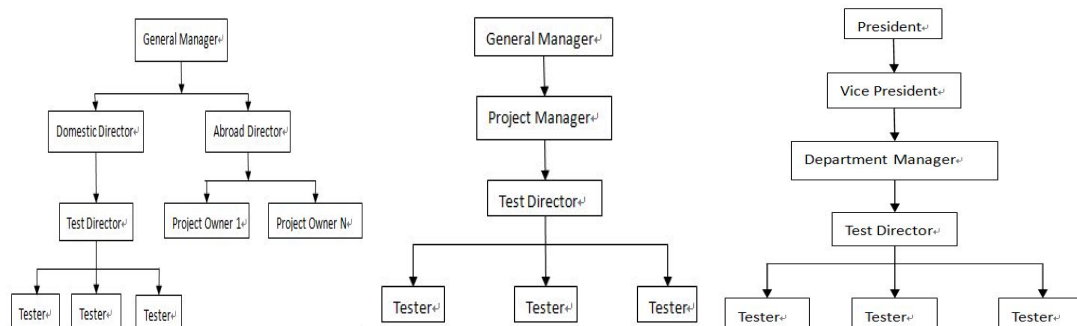
#### 3.3 Background of cases

We have already interviewed three vendors in Beijing, which are in different sizes and ability levels.

**Table 2. Profile of the vendors studied**

Vendor	Market	Members	Background
A: large multinational company	Customers are in North America, Europe, and Southeast Asia. Focus on financial and medical industries.	7000	Listed company cooperated with America and Canada
B: medium-sized multinational company	Customers are in America and Europe. Involved in finance, banking, medical and other industries.	100+	Proprietorship established by Chinese Americans and foreign students
C: small-sized company	90% of customers are in America. Involved in government projects and storage and recovery of big data.	30	Joint ventures

All the interviewed departments in the three vendors are test departments. The organization structures of these vendors are shown in Figure 1:

**Figure 1. The organization structure of the three vendors**

In offshore software testing outsourcing projects, general manager in vendor B is the same role as abroad director in vendor A, as well as vice president in vendor C. The role of domestic director in vendor A, is same as project manager in vendor B and department manager in vendor C.

## 4. CASES ANALYSIS

### 4.1 Cross cultural communication

#### Vendor A - large multinational company

For easy communication with clients, vendor A has branches on clients' side, and established project teams which are responsible for communicating with customers. Every team has one director and several persons in charge of communication. The director has both background of customers' language and culture, while persons in charge of communication are sent from China, they all familiar with customers' language and have IT background. Every person's responsibility is in charge of communication in a small project, includes communication with clients and members of domestic testing teams.

In this situation, testers in China do not need to communicate with client orally frequently, which eases their communication pressures. If they face some difficult problems in the projects, they can contact directly with persons in charge of communication. However, there are still a lot of difficult in written communication between testers and clients. During their coordination with clients, responsible persons can bring information and useful tools from clients to testing teams. ("The unified code management system is very good for protection of our code and code coverage between different people." said by an interviewed tester. )

However, there are still several projects that have no persons responsible for communication. Managers in vendor A are looking for right people for these positions. ("Although it will costs more money to hire specialized communication staffs, we are willing to pay the investment for long time coordination with clients." said by the interviewed director. )

#### Vendor B - medium-sized multinational company

From the interview, we found out that vendor B do not have specialized policies to solve communication problems. In the beginning of project, project manager communicates with customers for one or two times, and

the detailed communication is managed by testing manager and other testers. Without fixed communication mechanism, testing manager has to communicate with clients by emails, even conference calls. Insufficient understandings influence progress and quality of testing tasks, and many potential defects cannot be found. (“Sometimes we get help from colleagues majored in English, but it cannot be a routine.” said by an interviewed testing manager. )

Communication is inefficient in vendor B. For example, if the project team does not understand some questions well during conference calls, the testing manager will send emails to clients, as well as general manager or project manager. Without overall coordination and supervision of communication, the testing manager cannot receive customer response timely and need to track further. If the clients do not send response after two working days, the general manager needs to call customers.

Although the communication problems are not solved, there are still good aspects in vendor B. There is a defect management tool in vendor B. Problems found during testing are recorded in defect management system and assigned to testing managers before sent to customers. (“It helps us to prevent invalid bug submit to customers.” said by interviewed staff). In the case management progress, one tester’s cases are evaluated by other team members, thus prevents the situation that case coverage is not comprehensive.

#### **Vendor C - small-sized company**

During the interview of vendor C, we found out that language barriers and culture differences are still the main problems in communication between Chinese testers and foreign clients. However, interviewed staffs in vendor C said that these barriers actually do not influence delivery of projects. This is due to the company’s process and personnel structure. The U. S. branch of vendor C is responsible for communication with clients, while project team in China is responsible for projects implementation. The person in charge of communication with clients is the vice president, who is a Chinese-American with American education background and IT background. The Chinese team is composed of a project manager and several testers. The project manager who is responsible for management of projects and communication has many years of foreign working experiences and can communicate by English fluently. The testing manager has years of experiences of testing management and outsourcing, and is responsible for testing management in projects.

The most prominent point of vendor C is that the company passed the evaluation and certification of CMMI3 and applied it to all the management process of projects. The unified communication management process helps all the members to deal with regular problems. Furthermore, vendor C applied templates of CMMI as well to establish their own defect template, case template, demand template, daily report template, prototype template, code specifications and testing structure. For unified management of projects, vendor C applied unified management and vision control systems.

#### **4.2 The role of boundary spanning capability**

Different measures of solving communication problems in the three companies have already reflected the content and role of boundary spanning capability in practical projects, showing in table 3.

**Table 3. The 3 dimensions distribution of boundary spanning capability in the companies**

Vendor	Boundary Spanner	Boundary Spanning Process	Boundary Object
A	Persons in Charge of Communication, Senior Manager, Testing Manager	Defect management process, daily report management process, task management process, case management process, problem solving process	The same templates with customer, e.g. defect template, case template, daily template, flow chart, development language, testing structure
B	General Manager, Test Director, Project Manager, Staffs skilled in English	Arrange meetings according to demand of projects; confirm information by emails	Defect management tool
C	Vice President, Project Manager	Defect management process, daily report management process, task management process, case management process, problem solving process	CMMI template, e.g. defect template, case template, demand template, daily report template, prototype template, code specifications and testing structure

**Boundary spanner** is person who is in charge of ensuring demand and knowledge to flow across boundaries, and spanners promote professional knowledge sharing between teams in different levels .

For directors, project managers and testing leaders as boundary spanners, cultural differences are not a big problem.

From the interviews, we found out that spanners, such as senior manager, department director and project manager, always have background of cross-culture, professional knowledge and projects experiences for many years. They are familiar with foreign language, cultural and work style of foreign customers, as well as Chinese culture. Both of these help them to solve problems in projects communication. Most of them do not have communication barriers.

**Table 4. Background of senior staff as boundary spanner**

Vendor	Position	Background
A	Department Director	Graduated from domestic famous university, 10 years work experiences in foreign companies, half of the time works abroad
B	Project Manager	Many years working experiences in international IT companies, coordination with foreign customers
	General Manager	Ethnic Chinese, educated in western countries, has IT master degree
C	Department Manager	Live and work abroad for more than 8 years, as leader of test task of large games projects
	Vice President	Graduated from American famous university, Served as CIO in international IT companies, now is consultant of customers as well

From analysis above, boundary spanners in vendor A are the persons in charge of communication. And in vendor A's other projects that without specified persons for communication, senior manager and testing manager act as spanner as well. The typical spanner in vendor C is the vice president. Sometimes project manager takes the role of spanner. The spanner structure in vendor A is more suitable in large companies, while that in vendor C is more useful in small companies. Along with the development of business, vendor C have to transform to vendor A's mechanism. Compared with vendor A and C, communication efficiency in vendor B is very low.

**Proposition1:** There is positive effect of boundary spanners in boundary capability and eliminating the influence of culture differences.

**Boundary object** is tool for communication and knowledge sharing between clients and vendors .

Although most of the testing engineers don't need to communicate with customers directly, the cultural differences they face in the outsourcing projects are still serious.

From the interview, we found out that vendor A and vendor C have already using some boundary objects to cope with the culture differences. Tester of vendor A said: "We use "workitem" to communicate with our clients in our project, we and our clients just need to fill some tables in the tool about our routine job every day. Although my English is limited, I don't feel I have so much communication problems in my work. In most of time, I don't need to communicate with our clients directly, if we have some communication problems we can't handle, we will ask our PM to help."

One testing engineer of vendor C mentioned: "We use a lot of tools same as our clients, such as defect template, case template, demand template, daily report template, prototype template, and code specifications. Every day, we send and receive a lot of tables, charts, and reports to/from our clients by email. Most of the problems we can deal with by email."

In the three interviewed vendors, vendor A and vendor C perform better than vendor B. Vendor A applies same control system and templates with customers, while vendor C applies CMMI templates same as clients. However, vendor B performs weak in this part as well. Although vendor B has inner testing plan and defect

template, their templates are not the same with customers'.

**Proposition2:** There is positive effect of boundary objects in boundary capability and eliminating the influence of culture boundaries.

**Boundary spanning process** is two-way information transferring across boundaries and mechanism that integrates, transfer and use knowledge.

In all the three vendors there are defect management process and testing management process, but vendor C is the best with part of CMMI process management. Vendor A has its own fixed process management and prepares well for unexpected situations. Without fixed process, vendor B is the weakest of three companies.

The interviewed manager in vendor A said: “we have defect management process in our projects using an information system. Our employees and the clients can use the system in the same time, so we can share information and communicate more easily. There is the same about the testing management process.” Divisional manager in vendor C talked about their CMMI process management like this: “This process management is very good for the management and implementation of the projects. The standard process we use is the same with our clients, and it really helps us to avoid some misunderstandings between us and our clients.”

Obviously, vendor A and vendor C are both have high level boundary spanning capability. Vendor B is larger than vendor C in scale, but its performance in boundary spanning capability is not as good as vendor C.

**Proposition3:** There is positive effect of boundary spanning processes in boundary capability and eliminating the influence of culture differences.

As a combination of proposition 1, 2 and 3, we put forward proposition 4 as below:

**Proposition4:** The boundary spanning capability can eliminate the influence of cultural differences.

Combined with the success rate of three companies shown in table 5, we find out that there is positive impact of boundary spanning capability on success rate.

**Table 5. The relationship of boundary spanning capability and success rate**

Vendor	Strength	Success Rate
A	Strong	80%
B	Weak	65%
C	Strong	90%

**Proposition5:** There is negative effect of cultural differences on projects success, and eliminating the influence of cultural differences can promote the success of the projects.

## 5. CONTRIBUTIONS

From vendors' perspective, this study choose three vendors as research cases to investigate the influence of boundary spanning capability on cultural differences in outsourcing projects by multi-case study method. Most researches on boundary spanning in off shoring focus on the eliminating of domain knowledge gaps, but there are not so many researches on their impact of culture differences. Our research can expand the scope of boundary spanning capability and enrich studies in related fields. Since our research collected data from local Chinese off shoring vendors, the conclusions have some reference value for other Chinese vendor companies.

## ACKNOWLEDGEMENT

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