Communication Effectiveness in Global Virtual Teams: A Case Study of Software Outsourcing Industry in China

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Abstract

As global virtual team (GVT) is staffed by members from different countries working at different sites, its success relies heavily on effective communication. The purpose of this study is to explore factors affecting GVT communication effectiveness and how they work. After a review of prior studies, two aspects were identified, namely critical success factors (CSFs) and team characteristics, each represented by a series of technological, managerial, or structural elements of the team. A case study observing 6 GVTs in 3 international IT organizations in Dalian Software Park (Dalian, China) was conducted to examine the research model. Findings indicated that: 1) although GVT communication effectiveness is primarily affected by task-oriented communication, social communication cannot be ignored; 2) task-oriented communication and social communication are affected not only by the identified CSFs and team characteristics but also by task characteristics. Measures to improve GVT communication are proposed.

1. Introduction

As an agile mechanism, global virtual teams (GVTs) are getting more and more preference by industries. Also, scholars are increasingly interested in this boundaryless organization form. Generally speaking, a GVT is a temporary team “assembled on an as-needed basis for the duration of a task” [11] and staffed by a group of people who work “across space, time, and organizational boundaries” [14]. Team members take technology-supported communication as their dominating communication channel, and they seldom meet in person. GVT enables organizations integrate resources around the world to make decisions, implement actions, and control cost. However, the realization of these advantages is determined by effective communications.

It is found that 77% of managerial problems in organizations are related to communication effectiveness [26]. Some studies [3, 17] found that communication in GVTs was not as effective as that in collocated teams. In fact, some consider communication in GVTs as a determining factor of GVTs performance [2]. Hence, communication effectiveness is treated as a dependent variable in this study. It refers to the fit between communication patterns to the tasks [16]. The study was designed to explore factors that affect the communication effectiveness.

Initially, two aspects were identified: critical success factors (CSFs) and team characteristics. The CSFs include communication technologies and team management; team characteristics include the degree of virtualness and demographic diversity of the team. A case study observing 6 GVTs within 3 international IT organizations in Dalian Software Park (China) was conducted to examine the research model. Findings indicated that communication effectiveness is affected not only by CSFs and team characteristics, but also by task characteristics, i.e. the complexity and importance of task, requirement changes, and interdependences between subtasks. Also how these factors affect the effectiveness of communication and the relationships among them are discussed. Meanwhile, measures to improve GVT communication are proposed.

2. Literature review

GVT is task-oriented and is considered as an effective way to promptly adapt to dynamic global environments. Great interest in GVT causes a large number of studies on this emerging organizational form. Various aspects concerning GVTs were examined. Briefly, previous studies primarily focused on the following aspects: the comparison between virtual teams and collocated teams [19]; modeling factors affecting virtual team’s performance [13]; communication technologies in GVTs [22] or media selection and usage [1]; trust in GVTs [20]; team leadership [9]; and culture diversity [22].
Several studies performed comprehensive reviews of previous studies on virtual teams and focused on different aspects [6, 10, 21]. For instance, Gillam et al. [6] provided an overview of virtual teams and identified several issues virtual teams faced, e.g., communication issues, technical issues, and cultural issues. Hertel et al. [10] summarized human resource management tasks for virtual teams based on a lifecycle model. Schiller et al. [21] reviewed 25 theories adopted to understand virtual teams. Although these studies offer us an overview of previous studies from different perspectives, none of them provides a clear framework of the communication effectiveness.

The unique characteristics of GVTs make the communication among team members a critical indicator of GVTs performance. Thus many studies explored issues related to communication in GVTs. However, most of these studies only focus on a single or several aspect(s) of communication, such as technological aspect [1, 5, 23], behavioral aspect [18], or cultural aspect [4, 22, 25], etc. Although all these studies made great contributions to both literature and practices, none of them presented a systematic framework to analyze communication effectiveness as a dependent variable. In addition, while there is a wealth of research on GVTs and GVT communication technologies, there is a lack of research on communication effectiveness in a certain industry, i.e., software industry. In this paper, American style and Japanese style communications were compared to better understand factors affecting effective GVT communication effectiveness in the context of software outsourcing industry.

3. Research model

3.1. Dimensions of GVT communication

Although a GVT is formed to accomplish task, the communication among members is not necessarily always task-oriented. Sometimes, they may communicate beyond task, and online friendship may be established when they are working “together”. Therefore, effective GVT communication should be examined from two dimensions: task-oriented communication and social communication [26], (as shown in Figure 1). The former refers to communication among members in terms of task-achieving issues; the latter is communication beyond work, and it enables members know each other better and provides an informal platform for long-term relationship. Thus, social communication will improve the coordination among members and subsequently enable them better complete the tasks.

![Figure 1. GVT communication effectiveness model](image-url)

3.2. Factors affecting GVT communication

3.2.1. Selection & use of ICT. A significant characteristic of GVTs is that team members dispersed at different sites. Therefore, ICT is the essential channel for GVT members to bridge space gap. The selection and use of ICT is of great importance in effective communication and has been intensively examined. Generally, it is examined either from rational perspective or from social perspective [23, 24]. The most frequently used theory is task-technology fit model [7]. It is argued that the better the technologies fit the communication needs, the more likely such technologies will be used [15, 23]. Meanwhile, these studies also indicated that technologies were not the only factor affecting effective communication. Some other factors such as spatial, temporal and cultural diversity also influence the communication.

3.2.2. GVT management. The greatest disadvantages of communication via ICT are the lack of nonverbal communication and the absence of social context cues. These disadvantages may lead to misunderstanding about the tasks and shape obstacles for GVT performance. Effective management is a way to overcome the shortcomings. For example, efficient task assignment and communication skills training could reduce conflicts among members; effective communication mechanism could facilitate members choose the most efficient ICT and help them better adapt to virtual context. Hence, GVT management has a positive impact on task-oriented communication. On the other hand, encouraging team members to communicate beyond work (such as sending cards to each other during holidays) is a good way to narrow spatial distance and improve the bonds. So, it is proposed that proper management measures also have a positive impact on social communication.
3.2.3. Degree of GVT virtualness. According to Kirkman and Mathieu [12], degree of virtualness is defined as “the extent to which team members use virtual tools (email, video conferencing, etc.) to communicate.” The use of virtual tools is due to geographic dispersion. Therefore, in this study, degree of virtualness refers to the spatial and temporal dispersion of team members. It is not hard to understand that the higher the spatial dispersion is, and the less overlapping work hours members share, the less effective the GVT communication will be. Meanwhile, the degree of virtualness impact GVTs’ selection of ICT. As indicated by [19], in teams where the spatial dispersion is high, but work hours of members mostly overlap, synchronous ICT such as video conference is likely to be used. Whereas in teams where the spatial dispersion is high and team members seldom have overlapping work hours, asynchronous ICT such as email is more likely to be used. So it is expected that the degree of virtualness affects the selection of ICT and the effectiveness of GVT communication.

3.2.4. Degree of GVTs’ demographic diversity. Degree of demographic diversity refers to cultural, linguistic, and expertise difference of team members. It is obvious that the higher demographic diversity is, the harder it will be for team members to communicate. This dimension of diversity affects the ICT selection and management measures. Take linguistic difference as an example. Members, whose native languages are different, tend to use asynchronous ICT such as email to communicate. Since email allows them to spend more time on organizing and rewording their questions.

3.3. Model of GVT communication effectiveness

Based on the discussion above, factors affecting GVT communication include technological, behavioral (GVT management) and contextual (geographic & demographic dispersion) aspect. For the purpose of analysis, GVT management and ICT selection & use are grouped as critical success factors (CSFs) of effective communication; degree of virtualness and demographic diversity of GVTs are grouped as team characteristics. Figure 1 shows how these factors affect communication and the inter-relationship among the factors. Briefly, communication effectiveness is jointly determined by task-oriented communication and social communication; both task-oriented communication and social communication are directly affected by CSFs and team characteristics.

4. Research method

The case study approach was used to explore factors affecting GVT communication effectiveness and to examine the research model.

4.1. Site and case selection

The study was conducted in Dalian Software Park, Dalian, China, from October to November, 2008. GVTs in software industry were selected as the target of this study due to the following two reasons. First, products of this industry (software) are easy to convey via internet. Second, computers are employees’ primary tools. Normally, these employees’ ability and self-efficacy of using ICT are better than others, and they are relatively more adaptive to this GVT structure which heavily relies on ICT for the interaction. We selected 6 GVTs within 3 international organizations as the “players”. The organizations are IBM (Dalian), HP (Dalian) and DHC (Dalian Hi-Think Computer Technology, Corp.). Three of these GVTs engaged in system development, another two engaged in system maintenance, and the other one engaged in data transfer between databases. All of these GVTs are staffed by Chinese and some from one or several of the following countries: Japan, America, India, Singapore, Philippines, Malaysia, and Australia. Although hundreds of personnel were involved in the case study, only those at the leader level or those who are familiar with the communication process were targeted for this research. Therefore, two project managers, three software developers and one quality controller were interviewed. Table 1 shows the demographic characteristics of the 6 GVTs.

4.2. Data collection

Data was collected by semi-structured interviews with the six persons who are close to the projects. Semi-structured interview was conducted because it is more flexible compared with structured interview. It helps us focus the interview topics that we wanted to explore without constraining them to a certain format. An interview guide was prepared and the topics were derived from literature. Each interview lasted between 60 and 75 minutes and permission to tape the interview was obtained at the start. In addition, outlines and critical issues were briefly written down in order to better analyze the data later.
Table 1. Demographic characteristics of the GVTs

<table>
<thead>
<tr>
<th>Team</th>
<th>Time</th>
<th>IT experience</th>
<th>Structure of Teams</th>
</tr>
</thead>
<tbody>
<tr>
<td>Team A</td>
<td>2008.10</td>
<td>8 years</td>
<td>American (2), Chinese (5), Indian (6-7).</td>
</tr>
<tr>
<td>Team B</td>
<td>2008.10</td>
<td>6 years</td>
<td>Singaporean, Malaysian, Filipino, Chinese. (Note: members involved in this team are dependent to the specific tasks. Generally, this team consists of 10-20 members from above countries.)</td>
</tr>
<tr>
<td>Team C</td>
<td>2008.10</td>
<td>7 years</td>
<td>Chinese (4), Japanese (3)</td>
</tr>
<tr>
<td>Team D</td>
<td>2008.10</td>
<td>8 years</td>
<td>Chinese (1, work in Japan), Chinese (2, work in Dalian, China), Chinese (5, work in Chengdu, China)</td>
</tr>
<tr>
<td>Team E</td>
<td>2008.11</td>
<td>3 years</td>
<td>Chinese, Indian, American, Australian, Japanese. (Note: members involved in this team are dependent to specific tasks)</td>
</tr>
<tr>
<td>Team F</td>
<td>2008.10</td>
<td>1 year</td>
<td>Japanese (20-30), Chinese. (Note: members involved in this team are dependent to specific tasks)</td>
</tr>
</tbody>
</table>

5. Data analysis and discussion

5.1. Team characteristics

5.1.1. Degree of virtualness. According to the data, we found that GVTs assumed American projects show a higher degree of virtualness, and those assumed Japanese projects show a lower degree of virtualness. It is believed that geographic diversity is the dominating reason. As the time difference between Beijing and New York is 12 hours (13 hours in winter), there is almost no overlapping work hours between team members. Therefore, asynchronous tools (email, voice mail) are employed to conduct communication, and some urgent decisions might not be implemented in time. In this case, communication is less effective. Meanwhile, because of the time difference, members seldom have chances to initiate an instant conversation during work time, thus the social communication hardly exists among them. On the other hand, time difference between Beijing and Tokyo is only one hour, which means work hours almost overlap. The communication initiated by each side could be responded soon, no matter which virtual tools are employed. In addition, the short distance from Japan to China facilitates face-to-face communications when solving complicated problems.

Our data also shows that team management is partially influenced by degree of virtualness. It is easier to manage GVTs with lower degree of virtualness. For example, if the members of a GVT are from the same organization, although they work at different places, the communication among them is more effective because of their shared organizational culture or rules. Problems encountered in the process of communication can be easily solved with the help of an authorized manager from the organization, as indicated by one of the interviewees. However, problems facing members from different organizations and countries (GVTs with higher degree of virtuality) are generally hard to solve because each of the members unconsciously maintain their own benefits. Thus, it is harder to manage such a team. In a word, the degree of virtualness not only affects the selection of virtual tools and team management, but also affects GVT communication effectiveness.

5.1.2. Demographic diversity. Demographic diversity was examined from three dimensions: cultural diversity, expertise difference, and linguistic diversity.

Culture difference was revealed to be an important factor affecting the performance of GVTs [4, 22]. Data collected in this study also confirms its impact on GVTs’ task oriented communication. With respect to national culture, China and Japan are countries with high context, whereas USA and Australia are countries with low context [8]. In high context culture, people rely more on nonverbal cues to maintain the harmony. They seldom say “no” to others, but express in a reserved way instead. In low context culture, people focus more on verbal communication. A high degree of individualism is shown in American and Australian culture. People from these countries usually express their opinions openly. If GVT members from different countries do not know the differences, misunderstanding is easily generated and the tasks might not be well completed. There are circumstances that the direct expression hurt their eastern partners,
and the misunderstanding causes a bad relationship among them. As stated by our IBM Indian interviewee, when “you are communicating with Australian, they are very straight. If you are not familiar with them, you may think they are rude. They make everything in your face. But that is not rude, that is their culture”. Accordingly, measures such as training on cultures should be taken to enable GVT members understand the difference and communicate properly. Thus, mistakes could be avoided in completing the tasks.

Our data also indicated that national culture has an impact on people’s perception of social communication. Members from American and Indian like to talk about their families and some other private issues. Such private talks created strong bonds with each other. But usually, the Japanese focus their communication on jobs only.

Cultural diversities also influence the selection & use of ICT and GVT management. For example, the Japanese prefer to communicate via emails even when video or telephone conferences are available, because emails provide documents for them to check afterwards. In this way, assignments for each member are clear and buck-passing could be avoided. However, the Americans prefer telephone conference. According to the interviews, in GVTs assuming Japanese projects, a Bridge System Engineer (BSE) is hired especially in charge of communication. Whereas in GVTs assuming American projects, members like to directly communicate with persons who are responsible for the specific assignments, no mediating roles are needed.

Expertise difference was also found to have an impact on effective communication. Since a GVT is staffed by members who are experts in different fields, expertise the members have may vary significantly. Thus, communicating with members from different fields is not an easy task. More time and more communications on details are required to understand each other. All the six GVTs have encountered such problems due to expertise difference. A good choice to conquer this obstacle is to cultivate or recruit members who have a good knowledge of both technology and marketing.

Since GVT members are from different countries, their native languages are different. Although English/Japanese is taken as the communication language, the language proficiency levels of members are uneven. This is an important reason for the lack of social communication among GVT members. Meanwhile, language problems also hinder the implementation of tasks. As stated by an interviewee, “my project manager studied in the Britain for many years. American English is not a problem for him, but Indian English really bothered him a lot. His misunderstanding even caused several mistakes”. Selecting members excellent in English/Japanese or hiring Bridge System Engineer (BSE) exclusively for communication are two plausible ways to solve language problems.

Also, linguistic diversity is found to affect the selection of communication tools. For those members who are not quite good at English/Japanese, they prefer asynchronous tools (e.g. email). Because these tools allow them to better digest the information they get and think over how to reply.

5.2. Task characteristics

Task Characteristics is a dimension not initially included in our model (see Figure 1). However, according to the interviews, task characteristics play a quite significant role in affecting GVT communication. According to the data, four characteristics were concluded: complexity of the task, importance of the task, degree of interdependence between subtasks, and changing of specific needs.

It is understandable that if the task is simple or ordinary, team members are able to finish it in a short time based on their knowledge and experience. But if the task is quite complex, or if it is a totally new project, GVT members have to discuss frequently on the details. In addition, synchronous technologies such as telephone or video conference will be used because these technologies could help GVT members better understand the tasks and reduce misunderstanding. Therefore, the more complex a task, the more communications are needed, and the more likely synchronous and rich technologies will be selected.

The interaction between subtasks is a primary challenge of effective GVT communication. Usually, GVT members assume different subtasks. But if the subtasks are interdependent, team members have to communicate frequently on the process or the content, and coordinate accordingly. According to our interviews, many tasks have to be re-executed again and again just because of the poor communication among GVT members.

Another challenge facing GVTs is the changing of specific task needs. If the need changes, the demander will communicate on the changing issues with the developer. The former want the task changed according to their requirement so as to meet new opportunities, and the latter are reluctant to made great changes to avoid re-designing and re-implementing. Beneficial conflicts between the two sides increase the frequency and difficulty of communication. According to the data, the Japanese usually re-evaluates how much money and time is required for the change of task. Whereas the American is properly ask the developers to have their change requirements done.
without re-evaluating the schedule and cost. In this case, GVT members have to give up the work they’ve already done and communicate again on the new task.

The importance of tasks primarily influences task-oriented communication. No matter whether the task itself is of great importance or the request comes from an important client, or the task is important to GVT members themselves, frequent communications are required to ensure the task accomplished. Important tasks such as developing military or aerospace software will draw great attention from GVT members. When executing such tasks, GVT members tend to be extremely cautious to avoid any mistake. Consequently, task-oriented communication increases to ensure the quality. Similarly, those tasks that could improve the ability of GVT members will motivate members to discuss how to better finish the tasks. If the client is very important to the organization that the GVT belongs to, team members will be asked to pay more attention to the task. In this case, communication on the task also increases.

5.3. Critical Success Factors

ICT selection & use and team management are considered as critical success factors affecting effective communication.

5.3.1. ICT selection & use. Data collected in this study shows that the frequently used ICTs are instant messaging (MSN/Sametime), email, telephone conference, Netmeeting/Emeeting, and video conference. In particular, email, instant messaging and telephone conference are the most popular ones. We found that ICT selection and use is affected by task characteristics, ICT characteristics, the preference of GVT members and the context in which ICT is used. Synchronous and rich technologies (such as video conference) benefit the users when task is complex and important. Members share the same or similar culture tend to communicate by using less rich technologies such as email or instant messaging. Japanese prefers to communicate via email, while the Americans prefer communications via telephone and/or video.

5.3.2. GVT management. According to the interviewees, all team members were aware of the importance of effective communication. However, measures to specify communication are absent. Many of the GVT members did not know how to communicate with people from other cultures. What’s more, technological team members have to spend much time on communication according to an interviewee. Essentially, the role of technological members is to implement an assigned task, but not to spend too much time on knowing what their tasks are. This definitely affects the implementation of tasks. Several measures may help to solve these problems. First, a clear communication norm should be presented. By doing so, team members could know how to start a communication and how to act properly. Second, regulations on rewards and penalties should be presented to encourage communication. Third, training on culture, language, and communication skills is essential. Fourth, in some cases, communication mechanism should be changed. Hiring a bridge system engineer is a choice to solve communication problems for technological members.

5.4. Social vs. task-oriented communication

In this study, communication is examined from two perspectives, namely, task-oriented communication and social communication. According to our data, most of the communications are task-oriented, but social communication plays an important role that we can not ignore.

Initially, the communication between GVT members is task-driven, and social communication does not exist, “slowly, when you work with them (other members)… communicate with them on daily basis… then you get social relationship with them”, stated by an interviewee. A pleasant experience of task-oriented communication is found to have a positive impact on the generating of social communication. For team members, the process of working “together” is a chance to know each other. If they cooperate very well, relationship outside of work is easily to be developed.

In return, such relationship is a non-ignorable force for task-oriented communication. Members who have a good relationship outside of work will offer help for each other in work on their own initiative, or help each other whenever they are needed. For example, as indicated by the interviewee from IBM India, people do not work in the weekend, but when you have a problem and need someone to check something, you know you can call someone in Beijing, he does not mind it, “if you have only formal relationship with them, something will be difficult”. According to another interviewee, in his team, when the tasks/problems are of the same importance, people tend to solve tasks submitted by those who have closer relationship with them. Consequently, appropriate social communication among members positively impacts task-oriented communication.

However, according to our data, social communication among members is not allowed by most organizations. It is reasonable to some extent, because there do exist such problems that members
spend much time talking about private things in work time, or an international call is made to chat on non-work topics at the company’s cost. Nevertheless, the interviewees have a common idea that social communication does help a lot in finishing tasks. Therefore, organizations should not simply say “no” to social communication. Communicating in private time should be encouraged.

5.5. Modified research model

According to the analysis above, factors affecting the effectiveness of GVT communication and the relationships among them are shown in Figure 2. Except for critical success factors and team characteristics, task characteristics are also included in the model. Actually, all the interviewees have a common idea that task characteristics are of great influence in GVT communication.

6. Conclusion and limitation

This paper conducted a qualitative research on GVT communication effectiveness. A framework to understand factors affecting effectiveness was presented. Briefly, communication in GVTs was examined from two perspectives: task-oriented communication and social communication. The two types of communication affect each other. Factors affecting the two dimensions include task characteristics, critical success factors, and team characteristics. Specifically, except the selection & use of ICT and team management, cultural, linguistic, and expertise differences in particular significantly affect GVT communication effectiveness. In addition, complexity, task importance, requirement changes, and task interdependence affect GVT communication. Meanwhile, the relationships between these factors were explained.

This study is limited due to a number of reasons. First of all, although the factors were identified from behavioral, technological, and structural aspects, they may not be exhaustive. Other factors such as project and team size, the nature of the projects, as well as the management structure and management styles might be important. Secondly, this study was conducted in one city, in one industry, and with limited number of GVTs. The results may not be generalized, and the research model may not be applicable to other industries. A cross sectional studies designed to target different kind of GVTs in different industry might help in examining the validity of the research model. Finally, the dependent variable, communication effectiveness was measured subjectively, i.e., member’s perceptions. A more objective measure such as time spent on communication and the outcome should be explored in future studies.

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8. Reference