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# Communication Ties in Distributed Work

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# Communication and Ties in Distributed Work

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**ABSTRACT**

Multinational corporations have IT departments that span the globe to support distributed business ventures. IT staff must provide support for the information systems that these centers of operations depend on, round the clock and around the globe. This provides an opportunity to study the phenomenon of distributed IT support team.

This study examined how a distributed IT support team coordinates an IT support event among the team members in different locations, separated by multiple time zones and oceans. The communication pattern of IT support events are described and discussed.

The researcher found that with established relationships and ties, IT support personnel may not have to be everywhere, IT support personnel may invoke resources associated with established relationships and ties and the presence of these resources may augment the presence of IT support personnel.

**Keywords**

IT support, communication, relationships

## INTRODUCTION

To be more competitive in this new business environment, organizations lower their cost of operations, locate themselves near their clienteles, and reevaluate their organizational structures and work processes with the adoption of information and communication technologies (ICTs) (Townsend, DeMarie, & Hendrickson, 1998).

A number of studies had investigated the effectiveness of virtual teams, virtual team group processes (Ahuja & Carley, 1998; Dube & Pare, 2001; Maznevski & Chudoba, 2000; Montoya-Weiss, Massey, & Song, 2001). Such studies provided insights on team development processes but usually in ad-hoc student groups within laboratory settings rather than examining existing teams in organizations (Powell, Piccoli and Ives, 2004).

In distributed teams, coordination becomes especially problematic because team members interactions were limited to less "rich" channels such as phone, fax, e-mail, and were stretched across time zones and distance.

In this research we examine the communication of distributed teams in multi-national corporations (MNCs) and what communication challenges distributed team members faced? Specific research questions include:

1. How can the methods of communication and coordination be characterized for the distributed work environment?
2. What are typified communication patterns and their effectiveness?

This investigation takes the form of organizational case studies, examining the distributed IT (information technology) support teams in two organizations focusing on patterns of communication and coordination.

## LITERATURE REVIEW

IT development and support is a complex social process that is communication and coordination intensive and when scaled to global dimensions, the complexity is magnified many times. "Going global" with such activities heightens these issues while adding complexities due to cultural, language, and organizational differences (Carmel & Agarwal, 2001).

An organizational unit cannot function without coordination and control; unfortunately, distance creates difficulties in both. Communication is a mediating factor affecting both coordination and control. It is the exchange of complete and unambiguous information— that is, the sender and receiver can reach a common understanding (Carmel & Agarwal, 2001; Fritz, Narasimhan, & Rhee, 1998).

Distance aggravates coordination and control problems directly or indirectly through its negative effects on communication. Distance negatively affect communication, which in turn reduces coordination effectiveness. In distributed teams, particularly those separated by wide distances, ICTs play a vital role in enabling communication and coordination.

### Communication

Communication is defined as the exchange of information between a sender and receiver and the inference of meaning between organizational participants. There are "different forms of interaction … they shape quite different organizational structures" (Weick & Browning, 1986 p. 245).

Narration, gossips, stories and storytelling are not just diversion; they connect facts, store complex summaries in retrievable forms, help people make sense of or comprehend their complex environments. What managers say and to whom they say it creates the working structure of the organization (Weick & Browning, 1986). Relationships or ties (both strong and weak) are thus established through different form of interactions.

The Chinese refer to this social networking as "quan xi" while others calls it "connections." Calling on personnel personal or professional social network is an important way tasks are accomplished in organizations. Granovetter (1983) suggests that these "connections," "quan xi" or acquaintances (weak ties) are less likely to be socially involved with one another. Weak ties are asserted to be important because their likelihood of being bridges between different segments is greater than would be expected and that it is greater than that of strong ties or close friends. Pickering and King (1995) suggests that weak ties link to strong ties networks provide access to organizationally useful information.

### ICT and Boundary Spanning

Organizational units like teams often have numerous boundaries, including geographic, temporal, functional, identity-based, organizational, expertise-related, cultural, historical, social, and political (Espinoza et al., 2003).

Organizations with geographically distributed operations are dependent on ICT to strengthen weak ties among the communities. In addition, organizations that depend on outside organizations for crucial inputs to production or for downstream distribution rely on ICT to facilitate inter-organizational coordination.

Organizations reaching out to larger geographical market result in a greater reliance on IT to manage the organizations and greater interdependence within and between organizations. IT support in these organizations became more complex as more actors from diverse groups and organizations become involved in the process. Communication and coordination becomes more critical for the IT support staff to successfully perform their work in this distributed environment.

With the outsourcing of various functions to domestic and international IT firms, team boundary issues become even more complicated. Outsourcing literature discusses how to manage outsourcing relationship at the firm level (Aalders, 2001; Aubert, Patry, & Rivard, 2002; Barthelemy, 2001), but little was said about the impact of the outsourcing on communication and coordination, particularly in the area of IT support. Outsourcing introduces organizational and geographic boundaries that may further impede communication and coordination among distributed team members.

## RESEARCH DESIGN

Case studies allow for fieldwork that "retains holistic and meaningful characteristics of real-life events" (Yin, 1994). A goal of casework is to observe the details of interaction in a particular, complex single situation (Stake, 1995). Two organizations were selected for the study as the evidence from multiple cases is often considered to be more compelling and the overall study is therefore regarded as being more robust (Yin, 2002, p. 46). The names of the two organizations and their staff were changed.

### Data Collection

A total of 30 staff from two organizations participated in the interviews. Tables 1 and 2 show the breakdown of the participants by location, and roles.

| Participants | Case 1 – Hotel-Inc | Case 2 – Navigation-Co |
|---|---|---|
| Hawaii-based | 13 | 4 |
| Non-Hawaii-based | 1* | 12 |
| Total | 14 | 16 |

**Table 1: Participants Breakdown by Locations**

* The interview was conducted via telephone and email.

| Participants | Case 1 – Hotel-Inc | Case 2 – Navigation-Co |
|---|---|---|
| Senior Executive/Managers | 4 | 4 |
| End-user | 2 | 0 |
| Helpdesk | 3 | 3 |
| Communications | 0 | 2 |
| Analyst/programmer | 3 | 3 |
| Operations/DB | 2 | 3 |
| Web | 0 | 1 |
| Total | 14 | 16 |

**Table 2: Participants Breakdown by Roles**

In this study, multiple data collection methods were employed—semi-structured interviews and observation were conducted over a period of 26 months for the two organizations to create rich descriptions. Documents, electronic newspapers, and journal databases were reviewed before and after the interviews to provide background information and new developments for the two organizations. Prolonged involvement with individual team members through less formal phone conversations and e-mails also enriched the experience. The researcher spent significant time to become familiar with the structure, language and history of the corporation and the team. It also allowed research site participants to become familiar with the researcher prior to the first semi-structured interview. These preliminary meetings provided background and context for the study and helped the researcher finalize the interview questions related to the distributed IT support within a global corporate environment.

All the participants agreed to have the interviews recorded. After each interview, notes of the interview were typed and the recorded interviews were transcribed as soon as possible.

### Case 1 - Hotel-Inc

Hotel-Inc is a full-service lodging and hospitality company in Hawaii managing over 50 properties with more than 13,000 rooms in Hawaii, Australia, Micronesia, Fiji, Tahiti and New Zealand. Each Hotel-Inc property embraces the local culture to create a true sense of place for guests.

Hotel-Inc has its corporate offices in Oahu, Hawaii. Hotel-Inc has centralized services – accounting, IT, finance, engineering, purchasing, and special projects – that support all the properties on Oahu, as well as indirectly the neighboring islands. These corporate departments work with the respective departments in each property.

Leading each property is the General Manager who has the overall responsibility of the property's profitability and room occupancy. The General Manager of the property reports to the corporate management team. The IT department takes care of all IT needs of all the properties located on Oahu, Hawaii. For properties outside of Oahu, Hawaii, the IT department is only responsible for the initial set up of the IT infrastructure and negotiating maintenance contract with the vendor. Subsequently the IT department takes on a consultative role in the day-to-day IT operations of the remote properties.

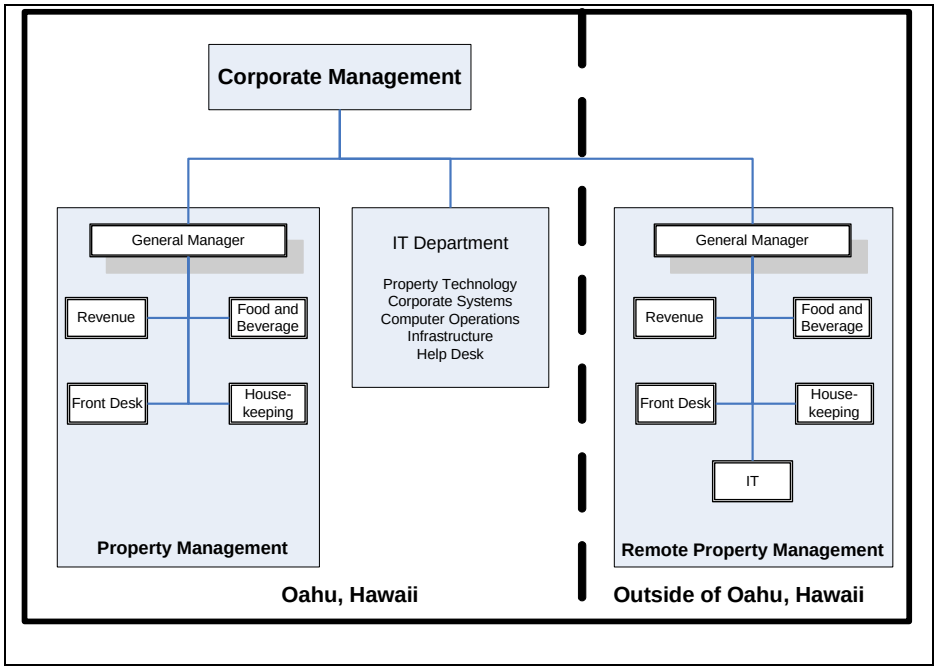


**Figure 1: Hotel-Inc's Organization Structure**

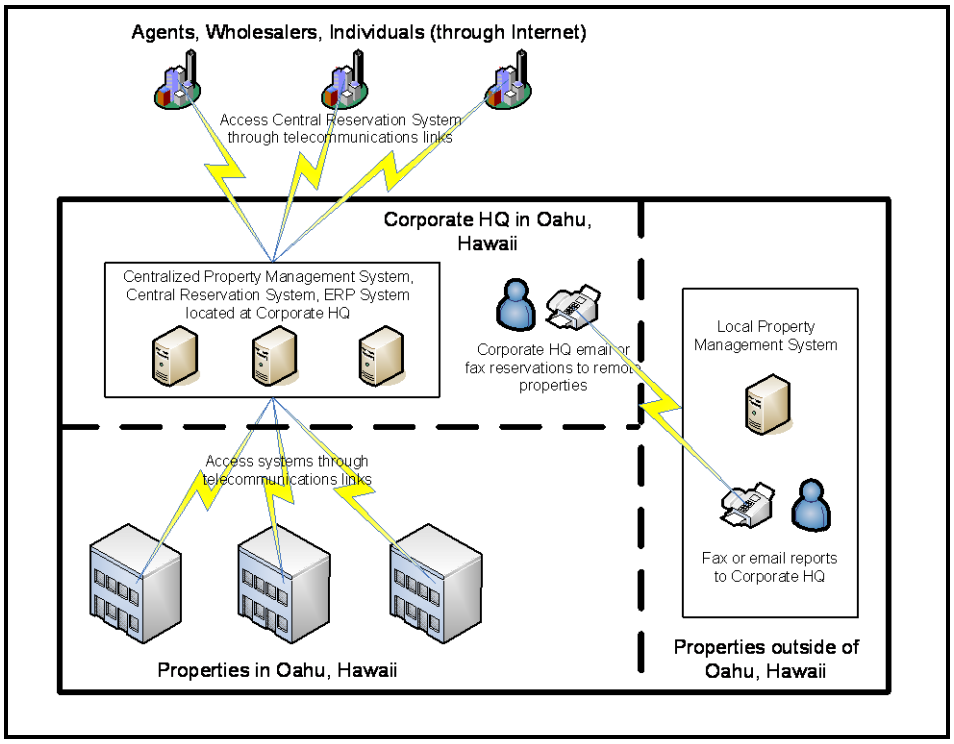


**Figure 2: Hotel-Inc's IT Infrastructure**

### Case 2 - Navigation-Co

Navigation-Co is headquartered in California and is a leading U.S. domestic shipping carrier offering customers a wide variety of transportation services between the West Coast and Hawaii, Guam and Mid-Pacific. Navigation-Co is recognized for its industry-leading Customer Support Center and online services via the Internet, allowing customers to efficiently and effectively manage their shipment information.

Navigation-Co has a highly centralized organizational structure within a globally distributed environment. The remote offices report directly to corporate management. The remote office IT department reports directly to the corporate IT group.

Navigation-Co had recently re-aligned all IT services along business functions resulting in higher volume of coordination of business activities among the remotes sites and headquarters. As a result, coordination of IT support as well as for business operations needs tightly coupled IT arrangements.

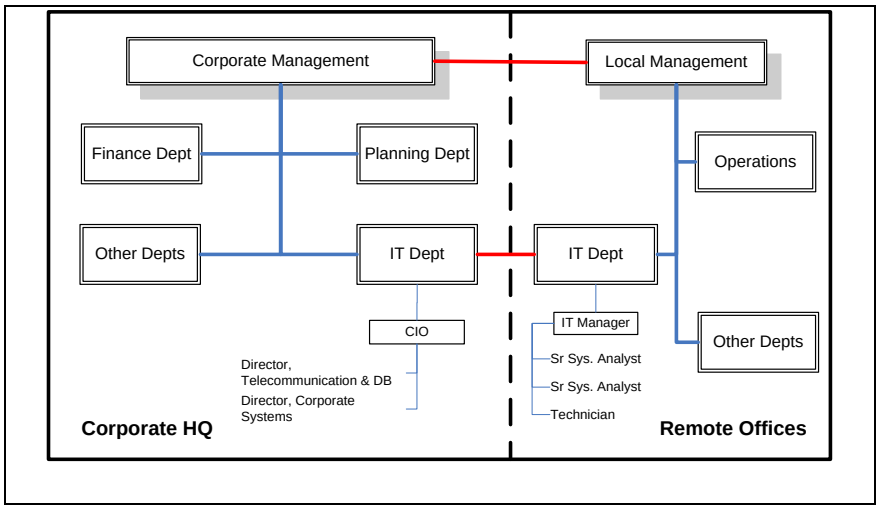


**Figure 3: Navigation-Co's Organization Structure**

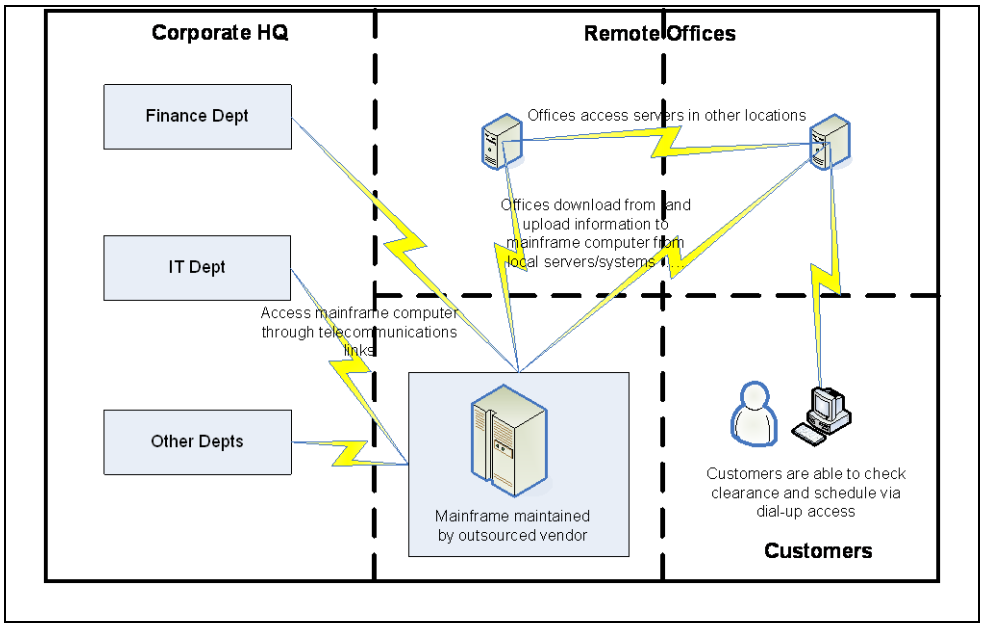


**Figure 4: Navigation-Co's IT Infrastructure**

Table 3 presents a summary of the characteristics and practices of the two case studies. Both organizations are similar in some ways and different in others. In both organizations, the organization structure is complex. Both are subsidiaries of a larger parent/holding company. Both organizations work closely with the other subsidiaries of their respective holding companies.

| Category | Hotel-Inc | Navigation-Co |
|---|---|---|
| Organization | • Highly Complex<br>• Centralized Management<br>• Medium to High Degree of Formalization<br>• Tightly coupled | • Highly Complex<br>• Centralized Management<br>• Medium Degree of Formalization<br>• Tightly coupled |
| Locations | • Oahu, Oahu<br>• Other Hawaiian Islands<br>• Australia<br>• New Zealand<br>• Asia/Pacific | • Terminals/ports in Hawaii<br>• Joint Ventures for terminals/ports on the West Coast<br>• Guam<br>• Arizona - Office<br>• Utah - Office |
| Computer Operations | In house – Oahu<br>Outsourced – Other Locations | Outsourced |
| PC Hardware/Software | In house – Oahu<br>Outsourced – Other Locations | In house |
| Web Design | Outsourced | Outsourced |

**Table 3: Summary of Characteristics and Practices**

### Data Analysis

The case studies resulted in the collection of significant amounts of data in a variety of formats. Utilizing key words and synonyms from the constructs of the ecological framework (Sundstrom, et al., 1990), the raw data (interview and notes) was reduced reiteratively. Several iterations of data coding was performed, adding and eliminating categories during subsequent passes through the data.

Through this iterative process broad areas emerged but it did not yield the complexities involved in providing IT support in a distributed environment. To fully paint the complexities involved in coordinating and providing IT support, 19 vignettes were constructed from the interviews and observations. The interactions in the vignettes were then analyzed to look for communication patterns.

## FINDINGS

Hotel-Inc and Navigation-Co use IT and ICTs tremendously though they use it differently to traverse different set of organizational boundaries. The IT support staff use synchronous ICTs when immediacy is required and asynchronous ICTs when communication is not time sensitive.

### Email

The majority of the communication is done through email. Email serves as a form of documentation in the communication and coordination process. Members of the team may communicate through various means but it is usually followed up with an email. The email serves as documentation as to what was discussed and agreed upon the parties involved and as a reminder.

For Navigation-Co, the emails are often sent to a distribution list. The Director of Application Development in Hawaii said that in this way everyone on the distribution list receives the email and is aware of the events happening around them. The other purpose of sending emails via distribution list is to reduce and eliminate meetings. Since everyone is aware of what is happening, the need to meet as a group is reduced.

Email is also used to pass on telephone messages in Navigation-Co. When a staff is busy, telephones messages are delivered via email. In this way, the staff is not disturbed and can respond to the messages when s/he is available. Email is view as less intrusive compared to telephone.

Navigation-Co also equipped many of their corporate IT support staff with Blackberry[i]. The Blackberry allows the staff to view emails while away from the desk or office. This permits the staff to monitor and respond to email immediately.

Email has become a mission critical application in most organizations. In these two case studies, email is widely used. Email is mostly used to document and share information especially when time is not a critical factor.

#### Instant Messaging (IM)

IM is gaining popularity within organizations. The Systems and Programming Manager (SPM) in Hotel-Inc uses IM widely. He may have six IM sessions going on simultaneously. The SPM has to interface with people in different office locations, vendors/partners, and free-lance programmers. According to the SPM,

> "I started using IM out of necessity. The cost to communicate with the free-lance programmer was too high. He lives in an RV and travels all over the continental USA. He has Internet access through a satellite hookup on his RV. It was cheaper to communicate with him though emails and IM then telephone calls. … IM is also not intrusive. If I'm on the telephone, I can reply to questions without interrupting my telephone conversation."

One of the advantages of the IM system was that when a person logs on, he or she can let the others know of his or her availability.

Many of the Hotel-Inc IT support team members use IM as if was less intrusive and a cheaper alternative to long-distance phone calls. Navigation-Inc on the other hand, relies on email and Backberry to communicate with other team members. They do not use IM.

#### Telephone and Teleconferencing

Telephone and teleconferencing were widely used in both organizations. Navigation-Co outsourced their mainframe computer operations. The corporate IT group has daily teleconference every morning with their outsourcing vendor to discuss operational matters, any previously unresolved issues, and upcoming plans. Members of the different sub-group within the corporate IT group and representatives from the outsourcing vendors from various locations across the US participated in the teleconference. Issues were discussed and also taken offline to be discussed separately between individuals in greater detail when needed.

For Hotel-Inc, the CIO works out of California half the time. The distance did not make any difference to his direct reports. He basically kept Hawaii hours even though he is working in California. As the Director of Corporate systems commented,

> "Having access to him isn't that bad, even though it is weird because he is far away. Even when he is here, sometimes, we may not see him a whole lot. Basically if we have any issues, we just give him a call. It is almost like calling an extension."

For both organizations, the IT helpdesk received calls from users and these calls were tracked by a trouble-call tracking system. They also have an escalation procedure and guidelines to ensure that the problems were resolved quickly and correctly routed.

Telephone was also widely used when providing IT support. It allowed users to crossed geographical boundaries giving users the impression/illusion that the other party was right there beside them. However, the telephone calls did not permit the helpdesk technician to see what kind of problems the users were having. The users had to describe as best as they could to the technician the problems they were having. As a result, both organizations relied on IT to bridge the physical distance between the users and the IT helpdesk staff.

Weak ties were usually invoked via telephone because of urgency of the matter at hand. The vendors IT support personnel were usually on site when the hardware/software was first installed. The personnel used that opportunity to get to know one another. It was easier to call on each other for help after having met face-to-face. It was no longer just a name but there is a face and a person to associate with a name.

The task on hand and immediacy determines the type of ICT used. In addition, preference of the managers also determines the type of ICT used to a large degree.

**Multi-Party Interaction in IT Support Event**

The complexities involved in coordinating and providing IT support in a distributed environment for the two organizations were depicted in figures 5 and 6 respectively. The figures were derived from the analysis of the interactions of the vignettes. Tables 4 and 5 summarized the parties involved in the interaction and the boundaries the interaction traversed for each organization.

The boxes in the figure represent the various parties involved in providing IT support to the user. Within the organization, these parties included the IT support staff, the corporate IT staff (IT role within firm), the staff that perform IT roles within a Business Unit (at times these IT staff are often call Shadow IT, as they perform the same functions as the IT staff within the firm, but these Shadow IT staff performs these functions only for their Business Units), and other knowledgeable users. IT support also comes from the outsourced IT support staff.

The bi-directional arrows represent the interactions. The thickness of the arrow shows the frequency of interaction, High, Medium, Low or Occasional level of interaction between the two parties. The amount of interaction between the parties is an approximate by the participants when they were asked how often they interact with the other parties.

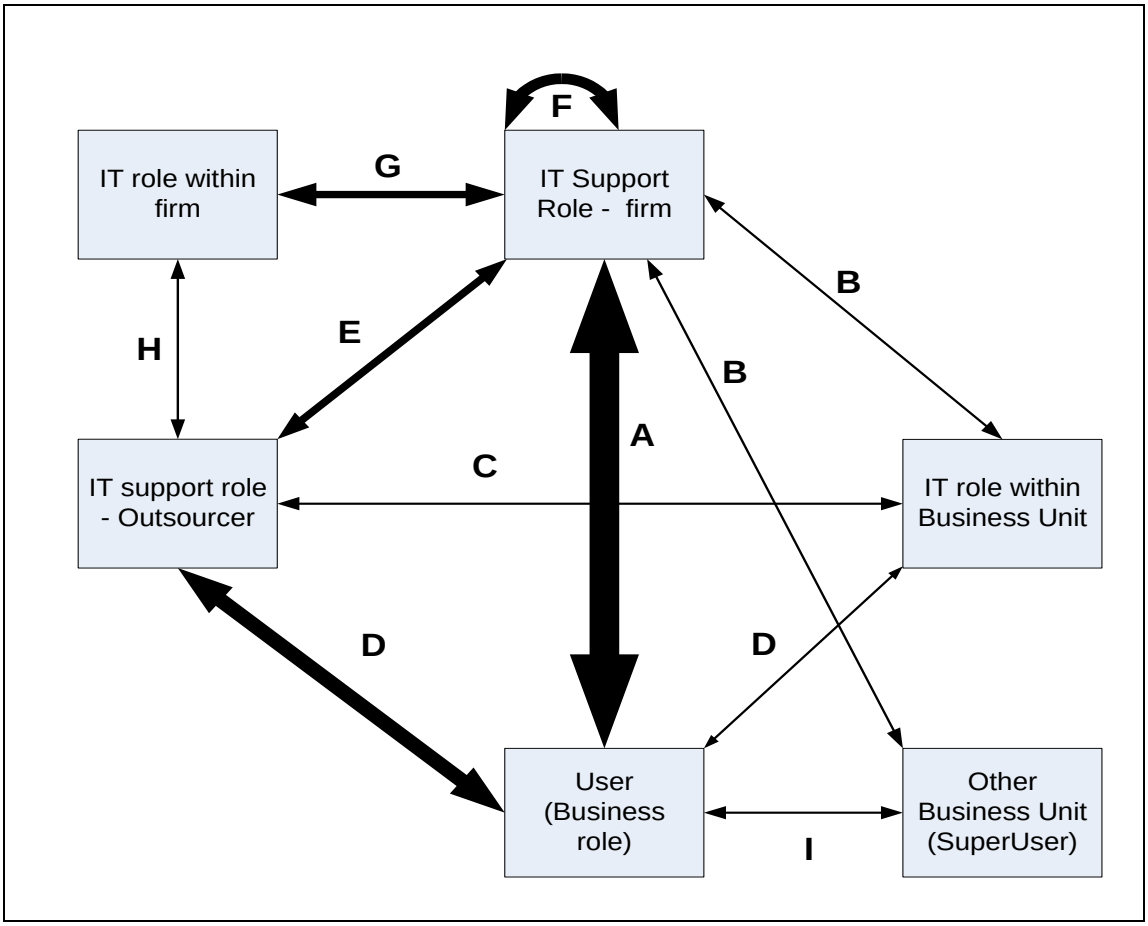


**Figure 5: Multi-party Interaction in IT Support Event – Hotel-Inc**

| Interaction | From/To | Boundaries Crossed | | | | Frequency of Interaction |
|---|---|---|---|---|---|---|
| | | **Temporal** | **Geographical** | **Intra** | **Inter** | |
| **A** | - IT support to User<br>- User to IT support | ✓ | ✓ | ✓ | | High |
| **B** | - IT support to SuperUser<br>- SuperUser to IT support | ✓ | ✓ | ✓ | | Occasional |
| | - IT support to Business IT<br>- Business IT to IT support | ✓ | ✓ | ✓ | | Occasional |
| **C** | - Outsourced IT support to Business IT<br>-Business IT to Outsourced IT support | ✓ | ✓ | | ✓ | Occasional |
| **D** | - Business IT to User<br>- User to Business IT | ✓ | ✓ | ✓ | | Occasional |
| | - Outsourced IT support to User<br>-User to Outsourced IT support | ✓ | ✓ | | ✓ | Medium |
| **E** | - IT support to Outsourced IT support<br>-Outsourced IT support to IT Support | ✓ | ✓ | | ✓ | Low |
| **F** | - IT support to IT support<br>- IT support to IT group<br>- IT group to IT support | ✓ | ✓ | ✓ | | Medium |
| **G** | - Outsourced IT support to IT group<br>- IT group to Outsourced IT support | ✓ | ✓ | | ✓ | Low |
| **H** | - Outsourced IT support to Outsourced IT group<br>- Outsourced IT group to Outsourced IT support | ✓ | ✓ | ✓ | | Occasional |
| **I** | - SuperUser to User<br>- User to SuperUser | ✓ | ✓ | ✓ | | Occasional |

**Table 4: Summary of Interactions in IT Support Event for Hotel-Inc**

Occasional = once or twice in a year
Low = once in three months
Medium= once or twice a month
High = two to four times a week

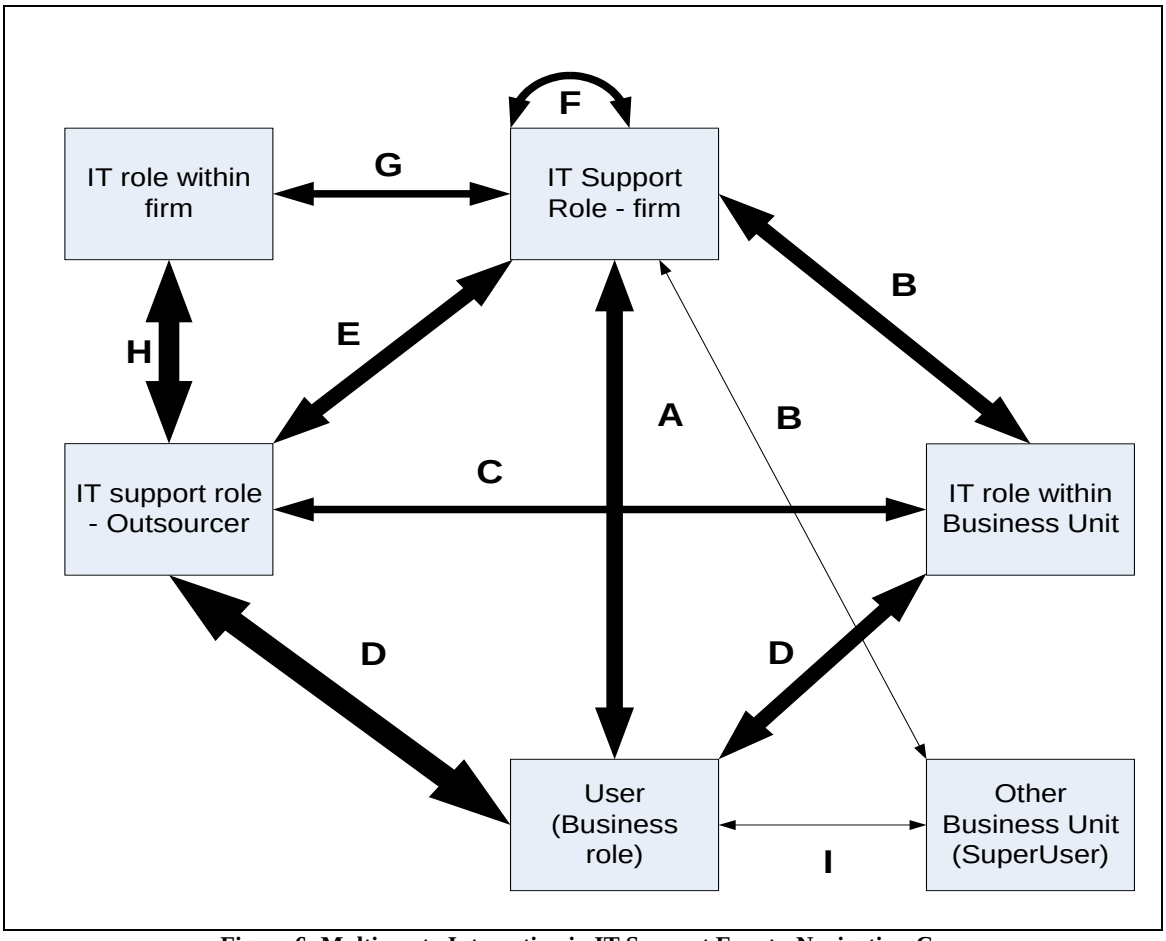


**Figure 6: Multi-party Interaction in IT Support Event - Navigation-Co**

| Interaction | From/To | Boundaries Crossed | | | | Frequency of Interaction |
|---|---|---|---|---|---|---|
| | | Temporal | Geographical | Intra | Inter | |
| **A** | - IT support to User<br>- User to IT support | ✓ | ✓ | ✓ | | Medium |
| **B** | - IT support to SuperUser<br>- SuperUser to IT support | ✓ | ✓ | ✓ | | Occasional |
| | - IT support to Business IT<br>- Business IT to IT support | ✓ | ✓ | ✓ | | Medium |
| **C** | - Outsourced IT support to Business IT<br>-Business IT to Outsourced IT support | ✓ | ✓ | | ✓ | Low |
| **D** | - Business IT to User<br>- User to Business IT | ✓ | ✓ | ✓ | | Medium |
| | - Outsourced IT support to User<br>-User to Outsourced IT support | ✓ | ✓ | | ✓ | High |
| **E** | - IT support to Outsourced IT support<br>-Outsourced IT support to IT Support | ✓ | ✓ | | ✓ | Medium |
| **F** | - IT support to IT support<br>- IT support to IT group<br>- IT group to IT support | ✓ | ✓ | ✓ | | Low to Medium |
| **G** | - Outsourced IT support to IT group<br>- IT group to Outsourced IT support | ✓ | ✓ | | ✓ | Low |
| **H** | - Outsourced IT support to Outsourced IT group<br>- Outsourced IT group to Outsourced IT support | ✓ | ✓ | ✓ | | High |
| **I** | - SuperUser to User<br>- User to SuperUser | ✓ | ✓ | ✓ | | Occasional |

**Table 5: Summary of Interactions in IT Support Event for Navigation-Co**

Occasional = once or twice in a year
Low = once in three months
Medium= once or twice a month
High = two to four times a week

The interactions between the different parties are labeled from A to I for easy identification. The arrow A represents the interaction between the IT support personnel and the users in the business units. The users often call the IT support via telephone and the support personnel tries to resolve the issue through the phone. The support personnel would occasionally take over the user's computer via remote control software.

The arrows B represent the interactions between the IT support personnel and users in other business units or SuperUsers. The SuperUser is a savvy computer user who is more technologically knowledgeable than the traditional computer user. For example, if the support personnel is unable to resolve the user's problem remotely, the support personnel would have to call upon one of his/her associates (thus invoking weak ties) in the same office to assist the user. In one example, the user's printer would not print, the support personnel could not physically access the printer. The support personnel called a SuperUser in the same office to check the printer's connection. In Hotel-Inc case, some of the IT support personnel used to

work in these business units before joining the IT department. Hence, they have developed a rich network of relationships with other personnel in the organization.

The other arrow B indicates the interaction between the IT support personnel and the shadow IT support personnel in the Business Units. The medium for these interactions is usually email unless there is an emergency.

The arrow C represents the interaction between the IT support personnel from the outsourced vendor and the business unit IT personnel. This is similar to arrow A except that the IT support personnel is from the outsourced vendor. This interaction crosses organizational boundaries. The medium for these interactions are telephone and emails. It includes discussions for a project/unresolved issue.

The arrows D represent the interactions between the user and business unit IT personnel or between the user and outsourced vendor's support personnel. These interactions are often carried via telephone. The users have a designated telephone number that they called to receive support. If the IT support personnel were unable to resolve the issue remotely then a technician would be dispatched to assist the user.

The arrow E represents the interaction between the IT support personnel and outsourced vendor's support personnel. The arrow F represents the interaction among the IT support personnel. As in arrows C, the personnel have developed a strong rapport especially when the vendor's personnel came on site for the installation of the software/hardware. The support personnel used that opportunity to get to know the vendor's personnel. This facilitated future corporations between the personnel. In one instance, the It support personnel from Navigation-Inc provided product improvement feedback to the vendor. The vendor was very appreciative of the feedback and it fostered closer cooperation between the organizations.

The arrows G, H and I represent interactions that are mentioned in interviews but the matter of the interactions are not elaborated in the interviews. The arrow G represents the interaction between the IT support personnel and the corporate IT staff. The arrow H represents the interaction between the Corporate IT personnel and the outsourced IT support staff. The arrow I represents the interaction between the users in other business units (e.g. superuser) and the user.

The Multi-Party Interaction model highlighted the parties involved in an IT support event and the boundaries that are traversed when providing and coordinating IT support. Both organizations outsourced some of their IT functions, Hotel-Inc outsource all its computer operations and PC support for the properties outside of Hawaii, while Navigation-Co outsourced their mainframe computer operations. As a result, the volume of interaction between the user and the IT support within firm and the volume of interaction between the user and the IT support within outsourcer for the two organizations are reversed. Furthermore, there are more interactions among the different parties in Navigation-Co during an IT support event.

In all the vignettes from the two cases, the IT support work that was to be performed often involved more than just the user and the IT support staff. It involved IT personnel from business unit and/or outsourced IT support staff, and other users from the same or different business units. It forced the IT support personnel to span organizational, both inter-organizational and intra-organizational boundaries, functional boundaries and geographical boundaries. The IT support personnel were able to span these boundaries effectively owing to the ties, both strong and weak, that had been established by the IT support personnel with the other parties. When the need arises, the IT support personnel would call upon the resources to assist in resolving the problems.

ICT enables the various parties to link across distance, time, departments and organizations. ICT also loosens constraints of proximity and structure in communication, making it possible for distributed parties to exchange messages with one another (DeSanctis & Monge, 1998).

A variety of ICTs were used by the IT support personnel (both internal and outsourced) and users to communicate with one another. The need for highly synchronous communication forces the IT personnel to communicate via IM and telephone while less urgent matters are communicated via email.

These interactions at times crossed functional boundaries represented by arrows F and I. On other occasions the interactions crossed organization boundaries (arrows C, D, E and G) or intra-organizational boundaries. The most common types of ICTs used are e-mail and telephone.

The weak ties between the IT support personnel and the IT support staff's circle of support were maintained through less frequent and less emotionally intense communication (telephone and occasional face-to-face meeting especially during lunch). The method of communication did not matter, but the reciprocity of the relationship mattered. Relationships that the IT personnel had developed were crucial to their success. The IT personnel took time to establish these relationships during face-to-face meetings and it made their lives more pleasant.

The two organizations in this study outsourced a portion of their IT services but took steps within their organizations to ensure that they are continuingly adding value to the organization and justifying their existence in the organization. In both organizations, the IT personnel have a good working knowledge of the business processes in addition to a good grasp of technology. In this way, the IT personnel can add value to the organization by recommending improvement to processes, etc. The Navigation-Co IT personnel familiarity with both the business processes and technology permit them to effectively managed outsourcing arrangement and the relationship with the outsourced vendors.

## CONCLUSION

Existing studies on distributed teams confined themselves largely to laboratory or field experiments using ad hoc teams and college students as subjects, or field study of temporary teams in organizations. These studies provide interesting information but lack critical information that would increase our understanding of coordination and communication within permanent distributed teams in organizations. The two case studies highlighted the coordination and communication pattern in a highly complex setting.

The old adage "it's not what you know but who you know that counts" holds a lot of truth in a distributed work environment. The Multi-Party Interaction model depicts the pattern of interaction in an IT support event. It also depicts the complexities involved in providing IT support. IT support often involves other parties other than the IT support staff members and the user. It also suggests that resources and information that are associated with relationships or ties are essential part of communication. Functional teams working in a distributed work environment may have similar communication methods and patterns but we will not know until more studies involving these functional teams are performed.

The weak ties of distributed team members are invoked easily through any method of communication. The interaction that takes place between the different parties helps to build and strengthen relationships.

In some cases of IT support, the geographical gap may be bridged through relationships and ties. IT support personnel may not be physically everywhere, but their influence or associates could be. With established relationships and ties, IT support personnel may invoke resources associated with established relationships and ties and augment their presence.

The type of ICT used for communications is largely determined by immediacy and geographical location. Synchronous ICTs are used when the interaction is highly time sensitive. Asynchronous ICTs like email are used when immediacy is not required. Email is used extensively in both case studies as a means of documenting the IT support events, telephone discussions, etc. Instant messaging is gaining popularity as it not only permitted synchronous communication, it also permitted other parties to know if a person is busy, away, etc. It is not the type of ICT used rather it is the ties or relationships that have been previously established that influenced the outcome that matters most.

## LIMITATIONS

This study has both strengths and limitations. A strength of this research was that it involved intensive data gathering processing that will inform our understanding of distributed IT support in natural settings. At the same time, such an approach raises questions of generalizability from a rich local description of two organizations to other non-local organizations. This study indicated that the case sites selected do highlight some research issues while not providing much insight into others. The goal was generalization to theoretical concepts, which would require testing in other empirical settings, either through further case studies or through other methods such as surveys.

Another limitation was that the investigation can be so all-encompassing that it was difficult to focus. Furthermore, it may be difficult to reconcile differences and assess how representative they are.

## FUTURE RESEARCH DIRECTIONS

The two organizations provided an excellent environment to study distributed teams and at the same time presented some unique situations that would require further investigations. The influence of more complex organization structure of the communication pattern of distributed team needs to be explored further. Future studies could include other functional area teams' interactions and the interactions among all the entities within a much larger holding company.

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