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Managing Virtual Project Team

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Abstract*— We describe managing virtual project team as a challenge because of its complexity and the potential risks. Through close investigation into a global virtual project (Project A) conducted by a multinational company (Organization X), we further explain why it is challenging to manage virtual team and how such challenge can be overcome by the management. Despite our report limitations, we think that although managing virtual project could be a turbulent experience, if managers are well prepared, it is still an option for organizations that are restrained by tightened budget and limited time provided.

Keywords: - Project a, Organization X, managing, project

I. INTRODUCTION

Over the last two decades, the form of collaboration in project team has changed significantly because of the revolutionized growth in information systems. Unlike project teams in traditional collaborative environment, where team members are co-located sitting next to each other, today's project teams are more flexibly distributed in terms of geographical locations. Furthermore, organizations nowadays are confronting with incremental competitions which require them to react and adapt to changes and customer needs ahead of their rivals. In order to reduce the project cost and duration, it is common to see organizations are replacing in-house project team with virtual one (Patil et al. 2011). Surveys also indicate that adopting virtual team can improve and maintaining profit of business in a highly competitive environment. It reduces implementation time and alleviates talent shortages. However, academia has not reached a conclusion in regards to whether virtual teams can outperform co-located ones (Powell et al. 2004). Actually, in spite of the chances to suffer from the potential problems caused by virtual teams, organizations still go for them because of tight budget in the short-term. Hence, it is of significant business value to explore virtual team as a project management challenge and be well prepared for them. By using a geographically distributed IT project (Project A) based on a field study in to a multinational corporation (Organization X) conducted by Patil et al. (2011), this report aims to closely examine the challenges brought by virtual project and present project managers with relevant solutions. The report is divided into three parts. The first part provides an overview of the project, covering its project effort and its structure within the organisation. Following is a theoretical discussion of key challenges faced by the virtual team. Based on part two, part three talks about how these challenges can affect organization X and how organization X should react to the challenges and opportunities brought forward by them.

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II. Part I. About Project A

Project Objective

Organization X is a large multinational company specializing in telecommunication. To further enhance its global competitiveness, the organisation started Project A to develop corporate software (Figure 1). With an approximate total of 125 employees assigned to the project, the project team members spread in five locations internationally: four in US and one in India. The primary goal of the project is to develop a middleware platform which could offer service to the organisation with a well-defined Application Programming Interface (API) so that the organisation can base its corporation-built high-level application software on the API framework (Patil et al. 2011).

Previously, the organisation was operated using disparate pieces to run it application software. This causes several problems to the company such as duplicated work across the Organization X and the need to develop a higher-level software application. To avoid the high cost for the organisation to build higher-level application software, it decided to synchronize current disparate pieces into a unified, homogenous and streamlined platform so existing high-level application software can be underlined by the new platform (Patil et al. 2011).

The platform was composed of eighteen modules, which would be debut at the same time as a whole. Among these 18 modules, very few of them were independent while the others were highly depending on the output of other modules. Hence, the entire scope of Project A is filled with collaborative planning and coordination. For example, the release installation module could not start until all other modules were installed. The project releases comprised several release cycles, the length of each was about three months. New features will be introduced in every successful release and bugs from previous release would be fixed. The plan of next release would be planned once the current one met set requirements.

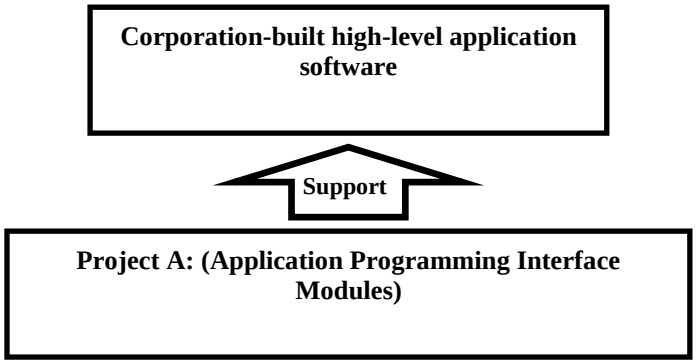

Figure 1. Purpose of Project A

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Project Structure

Figure 2 shows the structure of Project A. Top management person such as chief information officer, chief technology officer and project sponsor chief financial officer were sitting on the project board. Under the project board, the sub-team at each working site was coached by its own project manager (Patil et al. 2011). However, as further information such as how the eighteen modules were allocated to each team was not disclosed, we are not able to show a more detailed project structure.

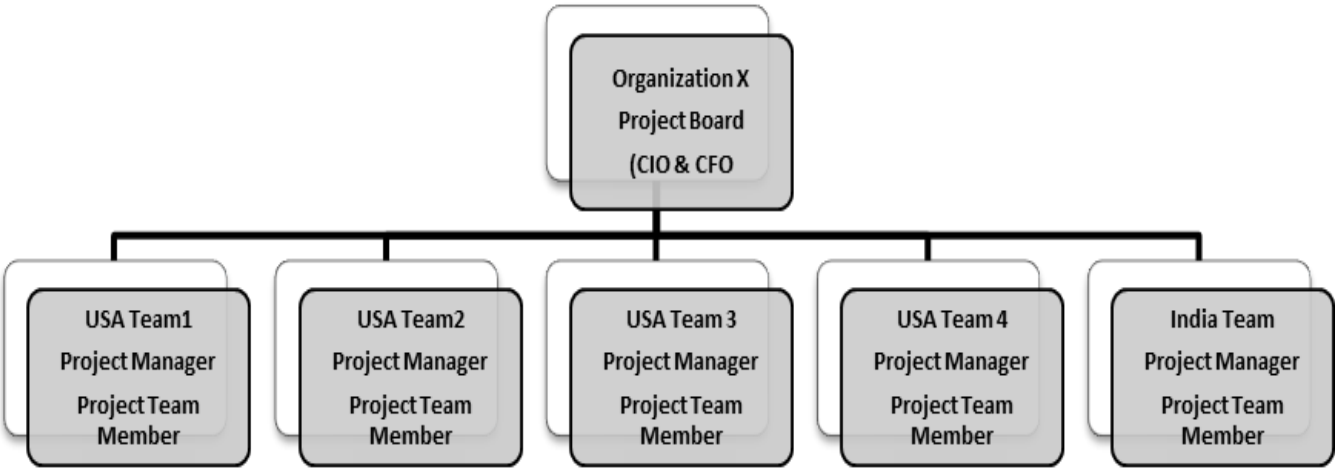

Figure 2. Project Structure

Project Effort

The importance of identifying project effort derives from its importance at the early stage of a development process that accurate project effort estimation is of primary concern for software development team (Shepperd & Schofield 1997). Barry et al. (2002) indicate the project effort has a significant impact on the duration of the project. By controlling other project characteristics such as project team skill, project type and project size, they find the increase of project effort can actually extend the duration of project, which might contribute to project creep if it is underestimated by project managers. Apart from this, Barry et al. (2012) also claim that the complexity and diversity of project would expanse project requirements, thus increase project scope and effort. Hence organisations have to confront with more challenges. Given that virtual project is complicated in terms of project environment and requirements, it is necessary to recognize IT project effort involved in Project A before get into project challenges. Project effort can be measured by the amount of staff working hours (Barry et al. 2002; Shan et al. 2002). There are approximately 125 staff working in Project A through the entire process. The whole project team is composed of system engineers, system architects, platform developers and testers, Source Code Management and internal staff. Team members are coached by managers. These participants are spread in the five working site and the number of participants in each location varies from handful to over thirty. Among these participants, most developers, testers and operational-level managers were fully committed to the project. The commitment of other staff was depending on the phase of release at that moment. For example, a few system engineers worked full-time in specific stages while for the rest of time, their working schedule is more likely to be part-time or casual. Generally speaking, time contributed by these team members to Project A ranged from 3% to 100% (Patil et al. 2011).

As mentioned above, Project A was planned to be released using release cycles. Each release cycle last about three to four months. Additionally, each release cycle was depending on the previous one and there are eighteen modules which are highly interactive with each other. Furthermore, the final project deadline was required to be rigorously met for each team member across five locations. Hence, even neither the total working hours of the whole project team nor the number of release cycles is given by the field study by Patil et al. (2011), it can be estimated from here that, given a team of 125 staff working together for at least six months (two or more cycles), the total project effort is massive.

III. Part II. Understand Managing Virtual Project Team as a Challenge

This part will define virtual project team and explain why managing such team could be challenging for managers. To achieve better reader comprehension, we will talk about virtual project team features, the seven potential risks associated with this challenge and how this challenge could be overcome. We based our discussion on research by Reed and Knight (2010; 2012), who have applied a very sophisticated methodology to validate these risks. We select the top seven risks which showed the most likelihood to affect people involved in a virtual project.

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Virtual Project Team

Virtual project team, or distributed project team, is defined as a group made of organisationally, geographically and time dispersed members who use information Mumbi & McGill 2008 Desanctis & Poole 1994). The members of the group live in different cities, states, or even countries but they have a well elaborated beginning, an end and a schedule (Maryam 2002). The usage of virtual project team is mostly due to advances in telecommunications, globalization as well as the business travel costs and inconvenience.

Managing Virtual Project Team is A Challenge

The following diagram (Figure 3) outlines the relationship in virtual team activity. The inputs include design, culture, technical, and member training. These factors must interrelate with the socio-emotional factors (relationship building, cohesion, and trust) and the task processes factors (communication, coordination, and task technology) to attain the ideal results (perfection and satisfaction). If this cycle initiates and ends with involvement of all the factors, the desired results would be achieved. In contrast, any failure of the factor will lead to results lower than expectation. Therefore, business put a lot of effort to provide the required resources to facilitate to cohesiveness of all the factors (Macgregory & Torres-Coronas 2007). As a result, managing virtual project team is a significant challenge for project managers and deserves their attentions.

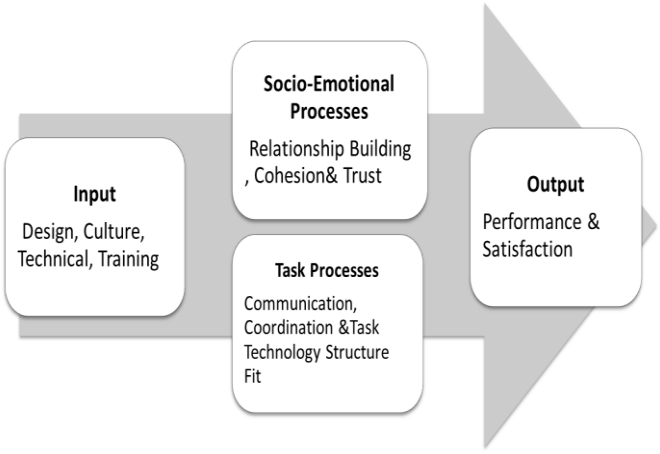

Figure 3. Virtual Team Activity Relationship

Virtual Project Team Features

Prior research has carried out abundant investigations into virtual project teams, such as trust, conflict and communication (Mumbi & McGill 2008). Majchrzak et al. (2000) identified three differences between virtual and traditional co-located teams. These included language and cultural differences, work style differences and problem solving approaches. Kirschner and Bruggen, (2004) who concerned about communication difference in their research, found virtual team was more advantageous when negotiating requirement among team members contained "conflicting perspectives". they associated such advantage with the lack of verbal cues that occur without face-to-face communications. In addition, earlier research advised the need to carefully select team members when building virtual teams due to differences in style (flexibility). This is because virtual teams usually had more ambiguity than co-located teams.

Issues/Risks Related to Virtual Project Team

In order to avoid project problems, project failures and even project disasters, risk management is vital. Additionally, researchers also concluded that high project failure rates could be attributed to the lack of good risk management practices (Lim & Mohamed 1999). Before risk management can be implemented, it is critical to identify what are these risks. This report identifies virtual project related risks adopting framework produced by Reed and Knight (2010; 2012) because of their sophisticated research methodology. They identify virtual project risk factors using questionnaires but before the questionnaire, a couple of verification steps were carried out. Firstly they underwent a literature review to identify a list of project risk factors. Secondly face-to-face interviews were undertaken with project practitioners in various departments from selected companies. Following that was an electronically facilitated focus group session held to identify any missed risk factors and validate those from the literature review and face to face interview. The last step involved sorting and combining results to produce a detailed list of all potential risk factors. After identification of all factors, the rating was according to the impact each risk had experienced before the successful completion of their projects. As a result, their finding could suitably represent the situation of real virtual project team because the risk factor list is validated not only by academic literatures but also by practitioners who have practical experience encountering and tackling virtual project issues.

The questionnaire showed the seven risks below are most likely to have significant impact on the project effort in virtual team environment. These factors are knowledge transfer, team cohesion, cultural or language differences, inadequate technical resources, time inexperience, team member loss and hidden agendas (Figure 4).

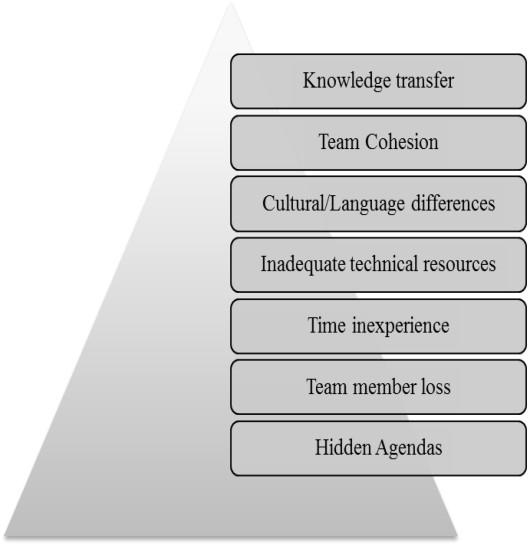

Figure 4. Key Risks Caused by Managing Virtual Project Team

To start, insufficient knowledge transfer showed the most significant difference in the level of impact between virtual and co-located teams.

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In this case, knowledge included the details of a software application, project team workings and business processes and procedures. If there would be no exchange of important details among individuals, then there was no completion of the project. On this risk factor, participants in a virtual team were more than participants in co-located teams (Pnina 2008). Therefore, this risk factor is a more concern of virtual team than the co-located teams. This difference might have occurred due to the difference in knowledge transfer in both teams. Virtual project teams lack face to face communication, which hinders knowledge transfer as Jones states in his own research.

The second risk is team cohesion. Lack of the project team cohesion occurs when there is jeopardy of good working relationship or when there is conflict among members (Erik 2007). The effects of lack of cohesion on Virtual teams were more than co-located teams. This could be associated by the fact that they can bond quicker than virtual teams. Therefore, this factor is a matter of consideration to the virtual team.

Thirdly, the risk factor of cultural/language difference may be impaired by team members speaking different languages. The cultural differences occur when team members from different countries have a different understanding of a concept (Godar & Ferris 2004). This could be timeliness or deadlines, which could result to missed meetings or unmet deadlines. This factor mostly affects the virtual team more than co-located teams. These revelations are in line with Lipnack and Stamps' findings.

The fourth issue is inadequate technical resources, which could take place, for example, when team members need to run test cycles on the company's mainframe computer, but cannot get sufficient CPU processing time. This is a factor associated with virtual team more than a co-located team factor. This could be because of communication's difficulties involved when requesting information online by the virtual team. Therefore, the virtual team requires a lot of technical tools to complete their projects as documented in Mayer's research findings.

Following that is time inexperience, which ranked the fifth in terms of the degree of impact. Along with the company and its processes, virtual project teams involve members of the team not being familiar with normal procedures. They may include the company's key goals and objectives, and procedures such as those for implementing software or requesting test cycles runs. This is a factor that causes problems to virtual teams more than co-located teams. This is because virtual team members work from places different from company's location contrary to co-located team members as Jones states in his research findings.

Loss or change of team member came the sixth according to the impact ranking. This factor is when one of the team member leaves from the team before project's completion. This risk factor affected the virtual team more than the co-located team, and this could be associated with the superstar syndrome (loss of best of the best member). In addition, the project's failure to complete its purpose may occur, when its completion requires interrelation among members, and one of them withdraws.

The last issue is hidden agenda. The hidden agenda risk factor involves a situation where members of the team have personal goals that they use the project to try to advance (Kevin 2004). This affects virtual teams more than the co-located teams. This could be associated with the fact that co-located members have better communication, which reveals members with hidden agendas. In the virtual team, lack of non-verbal cues can keep a hidden agenda completely invisible. However, this risk in both cases could be associated with the level of trust.

Overcome the Challenge

Business trips are arranged so that team members working outside the business location can have an opportunity to familiarize themselves with the company. This is done to address the challenge of knowledge transfer. Companies have upgraded their international communication methods. There is introduction of online camera telephones that facilitate image flow when one is making call. The usage of this online face-to-face communication is to address the challenge of lack of cohesion. Cultural/language difference is addressed by ensuring that team members are assigned duties that relates to their place of location. Electronic gadgets for language translation are used to address the challenge of language difference. Computer companies have introduced an efficient model of Operating Systems. For example, the Microsoft Windows 7 has facilitated business to address the challenge of lack of adequate technical resource efficiently. Experienced members of companies are grouped into support task forces to help teach new comers in the business practices. Regular board/ staff meetings are helping solve the challenge of team member loss and expose team members with hidden agendas. The diagram below outlines how the upgrade of business data software department is formulated. There are some efforts that have resulted into interconnection of computers through the internet. This is such that anyone in the system can access the information from a central server regardless of his location. The following diagram shows a computer of the person who needs to gets information from business' database. The diagram shows the flow of information until the person gets the information

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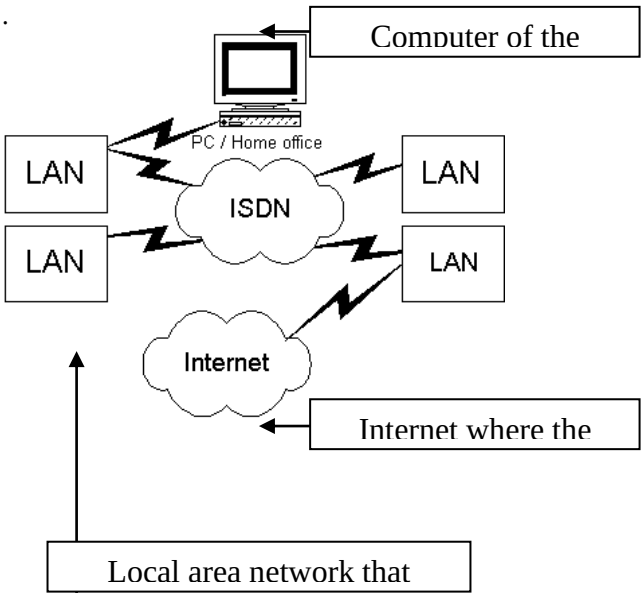

Figure 5. Flow of Information

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IV. Part III. Implication for Managers

By applying the challenge understanding part discussed above to Project A, we realize even adopting virtual project team allows Organization X to enjoy a number of benefits, including lower salary expenses, reduced travel time and expenses and shorter project development cycle caused by work sharing across different time zones, Organization X still faces a number of problems caused by virtual team. Following the order of the seven key issues listed in the second part, this section will discuss, through these seven potential risks, how virtual project team can affect Organization X, what are the possible problems and opportunities and how organization manager should react to it.

Problems, Impact and Solutions

Knowledge transfer

IT project team we are talking about is located in various geographical locations. Adding to this team has high time pressure to work on deliverable cycles one in 3 to 4 months and also has dependable modules. This calls for frequent communication among the team members. But initially team came up with a problem of miss communication in terms of procedures and standards to be followed while developing the software. This mainly occurred because the team members in few locations considered them as obvious and did not bother to clarify the procedures or standards of coding with other team members in different locations. During the time of integration of individual modules they faced many problems due to the differences in the procedures and standards of coding followed. This problem was identified only few days before the release date of first cycle. The final code after integration was not working so individual modules had to go back to their relative locations along with the clear list of procedures and standards to be followed. This delayed the project for nearly 2 weeks since the entire coding has to be revised thoroughly. The organization has to take responsibility of giving complete and clear instructions about projects policies, coding standards and procedures to be followed before the team members in various locations start working on, and they should instruct team members to exchange all possible information about the project even though it seems obvious to them forehand in order to avoid this kind of problems (Ebrahim et al. 2009).

Team Cohesion

Due to the fact that the team does not get to communicate often because of time pressure to meet requirements of deliverables, differences in time zones and differences in the amount of contribution to the project, this team had faced many cohesion problems which company was not able to identify in its early stages. Team was not bonded closely as the co-located members use to since the team members in virtual team spend very less time together. As a result they were not discussing much about their coding logics. This once led to spend time on same type of coding logic which the other team in US has already figured out. This led to waste time on developing same logic that could have been overcome if the team has nice bonding. Another issue aroused was one of the teams in US did not go with the decision taken by rest of them about project requirements, this mainly occurred because the team was unaware of few important factors other teams thought about. It led to delay in starting of project, since it took time for the management to fix the conflict.

This kind of issues can be overcome by arranging fun trips to the team members where they will get to know about each other and feel comfortable to communicate regarding their development procedures and logics. And also organization makes sure to invest on video conferencing one a week to discuss about the progress and ideas, which increases bonding between employees (Ebrahim et al. 2009).

Cultural/Language differences

Since IT project team is located in two different language speaking countries with completely different cultures, cultural and language differences occurred many times among the team members located in US and India. The Indian team members were not able to communicate their idea clearly since they are not that good in language as US, native English speakers, are. They also had problem in understanding when US team members used informal languages. But Indian team members tend to feel shy to ask the US team members to explain what they meant to say; instead they misinterpreted the requirements and started developing website according to their interpretation. This caused problem while Indian team delivered their module for first phase. This was not exactly matching up with the requirements of the clients so they had to make many changes in it, this wasted lot of effort and time for the Indian team as well as the first release of the project got delayed causing huge losses to the company.

To overcome this kind of problems we suggested the Indian team to be given training about the usage of English language by US people and brief idea about their culture. Should appoint team lead, who has good experience in dealing with US people in order to correct any miscommunications by team members (Ebrahim et al. 2009).

Team member loss

Losing team members without prior notice is not that common to happen, but in the team we are investigating it happen couple of times. A person who used to play key role in discussions with team members from overseas resigned his job without informing the team prior. When this happen the other team members in India panicked since no one else in the team knows information about his module, and also since he was playing key role while communicating with overseas they felt devastated. They took long time to fill his gap resulting in delay of delivery. This problem can be overcome by training buffered recourses in case of replacing one of the team member in emergency cases, and project manager should make sure that every single person in the team maintains good relation with overseas people and have enough knowledge about all the modules happening in particular location (Ebrahim et al. 2009).

Hidden Agendas

Hidden agenda is dangerous especially in virtual team. When it comes to the project we are investigating about, there were some issues regarding this. Since few of the team members have highly competitive spirit, they kept fighting over themselves by hiding information which was meant be shared among them.

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Since team members don't get to meet each other much often they were not having enough bonding to share their individual goals. This lead to develop highly competitive sprit among the team members which hindered the ability of team work as a result outcome was poor.

To deal with this kind of problem managers should make sure that they build trust among the team members and assign clear roles for the team where everyone will have common goals (Ebrahim et al. 2009).

Implications and lessons

Firstly, organisational should provide clear roles should be provided with proper guidelines. When there is no face to face communication with one another, virtual team members are unlikely to have convergent view on how the team can function and what is expected from each team member (Lam et al.). Secondly, it might be an option for organization to provide space for informal communication to increase the bonding among the virtual team members where they can exchange personal data like personal thoughts, interests and family backgrounds. This minimises coordination problem among them (Lam et al. 2005).

Also, organization should implement intermediate milestones to measure the team progress with achievable goals instead of assigning the work and expecting it to be done before deadline without any problem. This way any problems along the way can be found and will buy some time to correct it without affecting the deadline of project. By doing this team members will have a clear idea of learning objectives which will sharpen the discourse among them and promotes deep discussion (Lam et al. 2005).

Fourthly, while assessing the team, organization should consider the contribution of members for team discussions along with the final results. In this way team members will be motivated to speak up and try gaining much knowledge about the project (Lam et al. 2005).

Organization should also provide the team members with exposure to different styles and performances of other teams. This makes them aware of problems likely to occur and so team members will be careful to let the problem to occur (Lam et al. 2005).

Lastly, organization can have peer assessment system, where each member in the team confidentially gives feedback on others. Such system helps in deterring the problem of easy-riding or free-riding (Lam et al. 2005).

If organisation takes all these measures when implementing virtual team, it is most likely to be successful and save the budget on providing physical space to work together.

V CONCLUSION

In conclusion, by referring to a real virtual project performed by a multinational telecommunication company, we realize that, given the complexity involved in a virtual team, there are at least seven risks deserving attention from the management. Failing to manage these risks can result in losing the capability to produce desired outputs (perfection and satisfaction). This is aligning with previous research that whether virtual team can outperform traditional co-located project team still remains a question and this is the reason why managing virtual project team could be very challenging. However, there are still several solutions available to tackle the potential problems caused by these potential risks related to virtual project. Hence, we think adopting virtual project could be considered by managers if given tightened budget or limited time.

This report is subject to several limitations due to the available resources we have. Firstly, the investigation into Project A is based on a field study conducted by Patil et al. (2011). As a result, we are not able to provide more details than what was offered in their research, like how the eighteen API modules are assigned to each team. However, compared with a simulated experiment on students, field study might suffer from less generalization issue because it is closer to real business scenario. Secondly, the seven potential risks caused by managing virtual project team are cited from the work by Reed and Knight (2010; 2012). Although they have already taken several measures to ensure the validation of the risk list, due to the limited interviewees they can reach, this risk might still subject to generalization issue from this perspective. Thirdly, the project we selected in this report is a global virtual project. It is argued that global virtual project should be differentiated from local virtual project because it is difficult to separate the effect of language barrier from the effect of global virtual project. As a result, the challenge to manage global virtual team is more likely to be the challenge to manage language barrier. However, our argument for this point is global virtual project should be one form of virtual project because it is what is happening in the real world and even local project team can still encounter cultural or language difference if some team members are from overseas. Consequently, the traditional meaning of 'local project team' fakes due to the globalization and migration.

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