

VIRTUAL TEAM CHALLENGES TOWARDS PROJECT SUCCESS IN IT
PROJECTS

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Alhamdulillah,
Thank you ya Rabb for being there when nobody else was

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ABSTRACT

The concept of virtual team is increasingly becoming an important key to globalization challenges in competitive market place. The combination of business pull and technology push is likely stimulating the concept of virtual project team. Under business pull, today's projects need to be flexible to adapt to the growth of global operations. That is why, global project with virtual team members who are distributed across the globe is needed at addressing unexpected and extended project changes. Under technology pull, information technologies empower team members from different places to fit and split as determined by the task they share through shortened timescales, quicker decisions and enriched alignments. However, a number of impending drawbacks related to virtual teams have been identified. This study aims to recognize the influence of virtual team challenges towards project success in IT projects. A structured questionnaire was distributed to IT project practitioners within the studied IT support center serving multinational Oil and Gas Company across the globe. Findings from this study revealed that cultural differences is the most highly repetitive challenge while poor and lengthy decision making is the most severe challenge to virtual team in IT projects. Afterward, the effect of main challenges are recognize so that some practical suggestions can be utilized to alleviate virtual team challenges in IT projects.

ABSTRAK

Konsep berkerja secara alam maya telah menjadi unsur yang semakin penting untuk menghadapi cabaran globalisasi di dalam pasaran kompetitif. Konsep pasukan kerja alam maya ini berkemungkinan besar terhasil daripada gabungan '*business pull*' dan '*technology push*'. Melalui konsep '*business pull*', pasukan projek pada hari ini perlu fleksibel untuk menyesuaikan keadaan dengan pertumbuhan operasi global. Oleh yang demikian, pasukan kerja alam maya yang berkerja dari pelbagai lokasi di seluruh dunia di perlukan untuk menangani sebarang perubahan-perubahan di luar jangkaan di dalam kerja-kerja projek. Manakala, melalui konsep '*technology pull*', kemajuan teknologi maklumat pada hari ini memberi keupayaan kepada ahli-ahli pasukan kerja dari pelbagai lokasi yang berbeza untuk memenuhi tuntutan tugas melalui perkongsian skala waktu yang singkat, pantas di dalam membuat keputusan dan lebih tersusun. Walaubagaimanapun, beberapa kelemahan berkaitan pasukan kerja alam maya telah dikenalpasti. Justeru, matlamat kajian ini adalah untuk mengenalpasti cabaran-cabaran pasukan kerja alam maya dan pengaruhnya terhadap kejayaan di dalam projek-projek teknologi maklumat. Suatu struktur kajian soal-selidik telah diagihkan kepada pekerja-pekerja projek teknologi maklumat untuk sebuah syarikat minyak dan gas multinasional yang telah dikenalpasti. Hasil kajian mendapati bahawa cabaran berkaitan perbezaan budaya mempunyai kekerapan yang paling tinggi. Sementara itu, kelemahan dan lanjutan masa di dalam membuat keputusan mencatatkan ketegaran yang paling tinggi di dalam pasukan kerja alam maya untuk projek-projek teknologi maklumat. Kesan cabaran-cabaran ini ke atas pasukan kerja alam maya kemudian nya dinilai supaya beberapa cadangan praktikal boleh digunakan untuk mengurangkan kesan cabaran-cabaran itu ke atas projek-projek teknologi maklumat.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

The need to compete in a rapidly changing, hypercompetitive, and global market place has led many organizations to transform their organizational structures from large, hierarchical structures to agile and flexible new structures. To face globalization challenges, many large and multinational companies have started endeavor a distributed or dispersed team work.

In global project management, a team composed of members working in many locations and dispersed globally with communications occurs over a distance. Unlike traditional or collocated team, members are located at the same location and have close connection with other members through face-to-face interaction. This type of team usually has stronger team cohesion and trust. The communication also results in greater quality, productivity and efficiency. However, with six billion highly-talented people in the world, it is impossible to collocate all of them (Rico, 2013). Furthermore, global project team requires team members that have skills, local knowledge experience, resources and expertise from members who are distributed (Webster and Wong, 2008).

A statistic shows that 66 % of multinational companies already make extensive use of virtual team (Levey, 2014). Many driving forces, including advances in telecommunications, globalizations and the cost and dangers of business travels foster traditional project team towards the use of virtual team (Niederman and Tan, 2011). Further, virtual team is expected to grow significantly due to travel restrictions resulting from September 11 (Webster and Wong, 2008).

Having said the above, it seems that the combination of ‘business pull’ and ‘technology push’ is likely to stimulate the practice of virtual project team. The ‘business pull’ is being yielded by the growth of global operations, as organizations struggle to enter new markets, retrieve scientific talent and employ the wide-ranging human resource competencies of people from around the world.

As mentioned earlier, in competitive global market place, the emergence of customer needs become dynamic and unpredictable. Under ‘business pull’, today’s projects need to be flexible in order to adapt to their rapid changing needs. That is why; global project with virtual team members who are located across the globe is needed to address unplanned project scope changes. According to Rico (2013), the dynamic character of human talent is not aligned for a project management model based on collocated project teams. The marketplace is better aligned for one based on virtual teams, not collocated team. Supported by El-Sofany *et al.* (2014), virtual team have the strong advantage of gathering the best people for a specific task independent of their geographically location in a sort of ‘just in time talent’ approach. In short, many organizations have increasingly formed a virtual team as a means of connecting and engaging geographically dispersed members, thus lowering the costs associated with global collaboration and enabling greater speed and adaptability.

Meanwhile, the ‘technology push’ is being yielded by the emergence of effective and relatively cheap Information Technology (IT), ranging from simple email to sophisticated electronic collaborative tools. IT empowers people in different places work together as if they were in the same place. Fundamentally, it allows the virtual

team to fit and split as determined by the task they share. IT has already generating significant business impact through shortened timescales, quicker decisions and enriched alignment among team members (Grundy and Ginger, 1998).The intelligibility afforded by video-conferencing and the capacity to share data and applications in real time drastically minimizes the disagreements and uncertainty often relates to collaborative networks.

However, a number of impending drawbacks related with virtual teams have been reported. These include ineffective communication in the absence of face-to-face interactions among team members (Kurupparachchi, 2009) and multiple time-zones (Reed and Knight, 2013). Other reported obstacles that can hinder the performance of virtual teams are described in the next section of this report.

This study begins by identifying the main challenges facing IT project teams in context of virtual environment and later recognizes the effects of virtual team on project success follow by practical suggestions that can be used to alleviate virtual team challenges in IT projects

1.2 Problem Statement

Considering significant amount of virtual team complexity, it yields a substantial difference on the project success rate. Furthermore, scheduling impact due to a greater level of complexity carry a higher cost and scope creeps. Clearly, managing virtual project teams can be a daunting task for the project managers and also to the organizations. Therefore, it is important in this study to explore the challenges facing virtual team and recognize the effect towards project success and harvest positive impact to the growth of virtual team.

1.3 Aim and Objectives of the Study

The aim of this study is to recognize the influence of virtual team challenges towards project success in IT projects. To achieve the aim of the study, the following objectives have been identified.

- 1) To identify the main challenges facing virtual teams in IT projects.
- 2) To determine the effect of virtual team challenges towards success in IT projects.
- 3) To propose some practical suggestions that can be used to alleviate virtual team challenges in IT projects.

1.4 Scope of the Study

The scope of this study is focused on IT support center serving multinational Oil and Gas Company. The IT support center serves the business across the globe in multicultural team. The IT company provides follow-the-sun support model, IT infrastructure commission and decommission projects covering Far East, Europe and beyond, telecommunication and network security implementation, in-house application or software development and many more. For the purpose of this study, data collection and analysis was performed from IT project practitioners whom all work and/or efforts performed through project management to achieve specific IT goals. Having said that, an operational work and/or effort through permanent endeavor that produce repetitive activities is out of scope.

1.5 Significance of the Study

Virtual team is a new approach for people working together on projects and in research. New pressures facing organizations have led them to implement virtual team. The need to compete in global market motivates many organizations to transform their organizational structures to more flexible and distributed structures. As organization that fund virtual project team need to be aware that virtual project environments impact the triple constraints; budget/cost, time/schedules and scope, the challenges facing a virtual project team need to be worked out. With this study, identification of the challenges can be alleviated and increase efficiency and productivity of virtual project team members. With virtual team to stay, and that the challenges are known, this study begin to address and overcome these barriers to become truly effective when working virtually.

1.6 Limitation of the study

In this study, the virtual projects involved limited to global project management that using IT as a means of connecting and engaging project team.

REFERENCES

- Anandarajan, A., and Wen, H. J. (1999). Evaluation of information technology investment. *Management Decision*, Vol. 37, pp.329-339
- Anantatmula, V. and Thomas, M. (2010) Managing Global Projects; A Structured Approach for Better Performance. *Project Management Journal*, Vol. 41, pp.60-72
- Anderson, E. S., Birchall, D., Jessen, S. A., and Money, A. H. (2006). Exploring project success. *Baltic Journal of Management*. Vol.1, pp.127-147
- Au, Y., and Marks, A. (2012). Virtual teams are literally and metaphorically invisible: Forging identity in culturally diverse virtual teams. *Employee Relations*, Vol.34, pp.271-287
- Azimi, D. (2011). *Virtual Project Collaboration*. Norwegian University of Science and Technology.
- Barczak, G., McDonough, E.F. and Athanassiou, N. (2006) So you want to be a global project leader? *Research Technology Management*.
- Beranek, P. M., Broder, J., Reinig, B. A., Jr, N. C. R. and Sump, S. (2005) Management of Virtual Project Teams: Guidelines For Team Leaders. *Communication of the Association for Information Systems*, Vol.16, pp.247-259
- Bharadwaj, S.S. and Saxena, K.B.C. (2006) Impacting the Processes of Global Software Teams: A communication Technology Perspective. *The Journal of Business Perspective*, Vol.10, pp.63-75
- Bohm, C. (2013) Cultural Flexibility in ICT Projects: A New Perspective on Managing Diversity in Project Teams. *Global Journal of Flexible Systems Management*, Vol.14, pp.115 -122
- Brake, T. (2006). Leading global virtual teams. *Industrial and Commercial Training*, Vol.38, pp.116-121

- Curlee, W. (2008) Modern Virtual Project Management: The Effects of a Centralized and Decentralized Project Management Office. *Project Management Journal*, Vol.39, pp.83-96
- DeLone, W. h., McLean, E. R. (1992). Information System Success: The Quest for the Dependent Variable. The Institute of Management Sciences.
- Dube and Pare (2004) Virtual Teams: Projects, Protocols and Processes
- El-Sofany, H. Alwadani, H. and Alwadani, A. (2014) Managing Virtual Team Work in IT Projects: Survey. *International Journal of Advanced Corporate Learning*, Vol.7, pp.28-33
- ESI International (2013). *Managing IT Projects Participant Guide: IT project Management*. Washington: ESI International
- Espinosa, J. A., DeLone, W. and Lee, G. (2006). Global boundaries, task processes and IS project success: a field study. *Information Technology & People*, Vol. 19, pp.345-370
- Gilson, L. L., Maynard, M. T., Young, N. C. J., Vartiainen, M., and Hakonen, M. (2014). Virtual Team Research: 10 Years, 10 Themes and 10 Opportunities. *Journal of Management*, Vol.xx, pp.1-25
- Gressgard, L. J. (2010) Virtual team collaboration and innovation in organizations. *Team Performance Management*, Vol.17, pp.102-119
- Grosse, C. U. (2002) Managing Communication within Virtual Intercultural Teams. *Business Communication Quarterly*, Vol.65, pp.22-38
- Grundy, J. and Ginger, J. (1998) Global teams for the millennium. *Management Decision*, Vol.36, pp.31-33
- Holton, J. A. (2001). Building trust and collaboration in a virtual team. *Team Performance Management: An International Journal*, Vol. 7, pp.36-47
- Jugdev, K., Perkins, D., Fortune, J., White, D., and Walker, D. (2013). An exploratory study of project success with tools, software and methods. *International Journal of Managing Projects in Business*. Vol. 6, pp.534-551
- Kerzner, H. (2003). *Project Management: A system approach to planning, scheduling and controlling* (8th ed.) Canada: John Wiley & Sons, Inc.
- Kurupparachchi, P. R. (2009) Virtual Team Concepts in Projects: A Case Study. *Project Management Journal*, Vol.40, pp.19-33

- Kurupparachchi, P. R., Mandal, P., and Smith, R. (2002). IT project implementation strategies for effective changes: a critical review. *Logistic Information Management*, Vol.15, pp.126-137
- Levey, S. (2014) Elvis, statistics and virtual team. Available online <http://www.targettraining.eu/elvis-statistics-virtual-teams/> access on May 15
- Miller DC (1991). *Handbook of Research Design and Social Measurement*. 5th ed. Newbury Park, Calif.: Sage Publications.
- Monsour-Cole, Dana. (2015). Team identity formation in virtual team. *Virtual Team*, Vol.8, pp.41-58
- Morley, S., Cormican, K., and Folan, P. (2015). An Analysis of Virtual Team Characteristics: A Model for Virtual Project Managers. *Journal of Technology Management & Innovation*. Vol.10, pp.188-203
- Muller, R., and Jugdev, K. (2012). Critical success factors in projects: Pinto, Slevin and Prescott – the elucidation of project success. *International Journal of Managing Projects in Business*. Vol.5, pp.757-775
- Niederman, F. and Tan, F.B. (2011) Managing Global IT Teams: Considering Cultural Dynamics. *Communications of the ACM*, Vol.54, pp. 24-27
- O’Keefe, M. and Chen, E. T. (2011) The Impact of Emergent Web 2.0 on Virtual Teams. *Communications of the IIMA*, Vol.11, pp.91-106
- Peters, L. M., and Manz, C. C. (2007). Identifying antecedents of virtual team collaboration. *Team Performance Management*, Vol.13, pp.117-129
- Picolli, G., Powell, A., and Ives, B. (2004). Virtual team: team control structure, work processes, and team effectiveness. *Information Technology & People*, Vol.17, pp.359-379
- Prasad, K. and Akhilesh, K. B. (2002) Global virtual teams: what impacts their design and performance? *Team Performance Management: An International Journal*, Vol.8, pp.102-112
- Project Management Institute (2008). *A guide to the Project Management Body of Knowledge (PMBOK)* (4th ed.) Pennsylvania, USA
- Qureshi, S., Liu. M. and Vogel. D. (2006). The Effect of Electronic Collaboration in Distributed Project Management. *Group Decision & Negotiation*, pp.55-57
- Reed, A. H. and Knight, L. V. (2010) Project Risk Differences Between Virtual and Co-located Teams. *Journal of Computer Information Systems*, Fall 2010 19 – 30

- Rico, D. F. (2013) The paradox of agile project management and virtual teams. Available online <http://davidfrico.com/rico-apm-virtual.pdf> accessed on May 15
- Rolstadas, A., Tommelein, I., Schiefloe, P. M., Ballard, G. (2014). Understanding project success through analysis of project management approach. *International Journal of Managing Projects in Business*. Vol.7, pp.638-660
- Stough, S., Eom, S., and Buckenmyer, J. (2000). Virtual teaming: a strategy for moving your organization into the millennium. *Industrial Management & Data Systems*, Vol.100, pp.370-378
- Sung, C. H., Clausen, T. S., and Branson, L. (2008). Group Style Differences Between Virtual and FSF Teams. *American Journal of Business*, Vol.23, pp.65-70
- Taimour, A. N. (2005). Why IT Projects Fail. *The PROJECT PERFECT White Paper Collection*.
- Webster, J. and Wong, W. K. P. (2008) Comparing traditional and virtual group forms: Identity, communication and trust in naturally occurring project teams. *The international Journal of Human Resource Management*, Vol.19, pp.41- 62
- Zenun, M. M. N., Loureiro, G., and Araujo, C. S. (2007). The effects of teams' co-location on project performance. *Complex System Concurrent Engineering* (pp. 717-726). London: Springer-Verlag