

**WestminsterResearch**

<http://www.westminster.ac.uk/westminsterresearch>

**Is Knowledge transfer an obstacle? A post pandemic study of the challenges and proposing strategies to improve efficiency in distributed IS projects**

**Amar, H., Rafi-UI-Shan, P. and Mazhar, M.U.**

A conference paper presented at *EUROMA 2022*. Berlin, Germany 01 - 06 Jul 2022.

The WestminsterResearch online digital archive at the University of Westminster aims to make the research output of the University available to a wider audience. Copyright and Moral Rights remain with the authors and/or copyright owners.

# **Knowledge Transfer Process in Distributed IS Projects: A post-pandemic study of the challenges and proposing strategies to improve its effectiveness**

*Dr Hassan Amar (h.amar1@westminster.ac.uk)*

*University of Westminster, UK*

*Dr Piyya Muhammad Rafi-ul-Shan*

*Cardiff Metropolitan University, UK*

*Dr Muhammad Usman Mazhar*

*Nottingham Trent University, UK*

## **Abstract:**

Knowledge transfer (or sharing) has always been crucial within the dispersed teams' structure. As we are moving into post-Covid 19 pandemic times where the norms of working are being redefined, there becomes a need to revisit this area and examine the working collaboration of the teams for meeting clients' expectations, as there have been only few attempts undertaken after the pandemic. This study is based on interviewing 18 IT practitioners and professionals, further support by thematic analysis of data collected. The findings determined that for efficient knowledge transfer process 'sustaining coordination' is the core phenomenon together with having 'closed feedback loops, exchanging particulars and logs timely, dynamic reporting and building teams capacity' as sub-cores. The key observations identified from the results of this study were mainly the inclusion of several non-technical components which have now become essential, and back and forth support knowledge sharing in the distributed IS projects for productivity and completing tasks.

**Keywords:** Distributed projects, knowledge transfer, Sustaining Coordination

## **1.0 Introduction**

### **1.1 Background and Theoretical Review**

Developments in information and communication technologies (ICTs) have changed the dynamics of IS organisations especially after Covid-19 pandemic (He et al., 2021). Distributed IS projects are few of those projects which include team members or developers scattered over different regions or territory for achievement of shared tasks or goals for the development of software and web applications, enterprise resource management and financial management solutions etc (Garro-Abarca et al., 2021). In this study, while referring to distributed IS projects, the projects undertaking software and web development, enterprise resource management and financial solutions will be considered (Hossain et al., 2009; Keshlaf and Riddle, 2010). Covid-19 pandemic which brought severe financial and cybersecurity challenges for the IT sector has enforced organisations to review its working dynamics which mainly include reviewing the adaptability to technology and norms of collaboration (Zuofa and Ochieng, 2021).

The process of knowledge transfer has key implications in distributed IS projects. Knowledge transfer is considered as one of the most critical aspects of remote working. While being dispersed, the teams are not able to share knowledge and collaborate efficiently which further affects the product quality. According to Zuofa and Ochieng (2021), it has been reported that Covid-19 lockdowns, closure of workplaces, sickness etc. have negatively impacted on the communication structure of the dispersed teams as they were not able to interact and get appropriate support from the management. This led to consequences where the teams are not able to keep up with the required pace of the industry now. For example, as now when the worldwide market is abundantly open, there are many pending projects which need to be completed and delivered to customers as a priority. As the working dynamics of industry have been re-evaluated and we are moving out of the pandemic, this has put more pressure on the dispersed teams and IT organisations. There are several studies available in the literature before pandemic which highlighted key issues such as unclear objectives, overlapping of responsibilities, cultural differences, poor task management, lack of knowledge etc as some of the major challenges during knowledge transfer (Reed and Knight 2010; Lilian, 2014); however, there are gaps found in the literature to better comprehend evolving challenges, and respond to those for an efficient knowledge transfer process as we are entering into the post-pandemic times. A recent study by Keily et al. (2021) depicted that the most common issues within the global or distributed teams are effectiveness of project team coordination

mechanisms due to which projects face delays and have quality issues. Medappa and Srivasta (2019) further argued that there is a mechanisms within organisations, however, lack of coordination among distributed teams is becoming problematic for the organisations. Gallego et al. (2020) in another study depicted that project managers should consider the impact of integration and scope management when working with distributed teams as they cause many issues which are difficult to realise during the project. Hence, there is need to investigate how these evolving mechanisms have affected the frequency of knowledge transfers and issues linked with it to better respond to challenges in the distributed environments. This will also help to create strong collaboration between dispersed teams and deliver the software solutions up to the client's prospects.

## **1.2 Research Aim and Objectives**

Based on the research gaps available, the aim of this study was to explore challenges that cause disruption in the overall knowledge transfer process and propose strategies to overcome those in distributed IS projects post-pandemic. For achieving the aim, following research questions have been identified:

- What are the major challenges and issues that disrupt knowledge transfer process in distributed IS projects?
- What are the appropriate recommendations to overcome challenges and support efficient knowledge transfer during product development?

## **1.3 Research Rationale**

This research study is based on examining distributed IS project environments after the Covid-19 pandemic. The core purpose for selecting this area was to examine the frequency, norms and dynamicity of working conditions after the pandemic. Distributed IS projects is not a nascent area of study and there are some considerable studies available in the literature, however, knowledge sharing in such projects has always been a point of discussion. The key reasons are mainly the difference in cultural, work experiences, and lack of clear roles and responsibilities due to project face delays. That is the reason that around 50% of Agile methodology-based projects fail in distributed environment; though previously the failure rate was less than 25% when development was undertaken inhouse. Rajpal (2016) reported failure in distributed scrum projects, where a project took over three years to complete instead of one and exceeded five times from its initial budget. Similarly, studies by Zuofa and Ochieng (2021), Keily et al. (2021), Medappa and Srivasta (2019), Gallego et al. (2020) further depict that

research on distributed or virtual teams is still in progress and there are many attempts being made to fulfil gaps in the literature. One such knowledge gap is the assessment of knowledge transfer process within the distributed project environment after the pandemic to ensure better collaboration for managing tasks and completing job assignments up to the clients' expectations. Based on the knowledge gaps, the authors decided to undertake this study and uncover the strategies and/or practices to better understand the contemporary challenges and ensure an efficient knowledge transfer process during the distributed IS projects.

## **2.0 Research Methodology**

### **2.1 Interviewing and Sampling**

This study is based on qualitative research analysis where semi-structure interviewing was the dominant strategy for collecting data from professionals and practitioners working in the IT organizations. The authors used purposive sampling to locate most knowledgeable participants who could effectively contribute to the study (Creswell and Clark, 2011). The participants were chosen based on their experience in the distributed environments who have closely observed the transitions between pre- to post-pandemic times. A total number of 18 semi-structure interviews were conducted to discuss the challenges and issues, and then possible solutions to improve knowledge transfer process when working in distributed IS environments. Cavana et al. (2001) justified that interviews are exclusive and support in disclosing rich, rigorous and complex information from the participants in qualitative research. Participants who contributed to the study were from United Kingdom, Pakistan and UAE. The authors asked open questions to discuss the challenges and gave opportunity to participants to contribute from their experience. Interview questions were divided into two sections: Challenges and issues around knowledge transfer (or sharing), change of working dynamics and their effect on overall project activities. The second section of the interviews was based around the measures taken by those participants or their organisations to counter challenges linked with knowledge transfer and analyse how intense they are as compared to pre-pandemic times.

### **2.2 Data Analysis and Credibility**

Further, the data was collected and analysed under thematic analysis approach suggested by Braun and Clarke's (2013). Braun and Clarke's (2013) thematic analysis involve seven steps which were undertaken by the authors very carefully. This involved preparing transcriptions (getting familiarised with the data; coding them; identifying patterns (sub-themes and themes); searching,

reviewing themes; defining and finalising themes; and finalizing the analysis. These seven steps led to development of a tree diagram which has been shown in the figure 1. Further, the authors ensured credibility of the study by taking vigorous actions, such as, member checking, audit trail and peer scrutiny of the research journey.

### **3.0 Findings and Discussion**

The analysis of the data elaborated that as we are entering into post-pandemic times, there is a high demand, lack of skilled workers and excess pressures on completing the project backlogs. Henceforth, there is a need to revisit parameters for an effective knowledge transfer process within IT organisations. These parameters are usually based on high coordination and communication levels, however, there are many other factors which now affect the performance of the distributed team members. These team members not only include developers or basic-level programmers, but now participation from the senior management has become vital for meeting the desired quality levels and timelines.

Data suggests that an efficient knowledge transfer process is dependent on sustaining coordination, meaning a long-term plan and commitment to work efficiently. According to few of the participants,

*“Yes, the dynamics have changed, commitments have changed. Now we are looking for people who can work with us for long and commit their work, not prefer to hire part-timers. We would now like to be more sustainable now especially after the pandemic”* [P15]

*“Covid-19 has left the world with so many lessons. Few lessons we learnt are to prepare for the worst, keep intact with distributed team members, support them, and maintain a good coordination level. This indeed helps to bear pressures, share knowledge more deliberately and improves product quality”* [P17]

Sustaining coordination is further aided by four key areas (themes) such as use of closed feedback loops, exchanging particulars and logs timely, dynamic reporting and building team capacity (figure 1). These four key themes also represent the areas of major challenges or obstacles during the course of product development. As per the data, sustaining coordination is about developing agreements, understanding the requirements, nourishing, offering long-term commitments and meeting the teams' expectations over the course of project. The participants emphasized that in the post-pandemic times, teams need to develop a strong collaborative structure between them, offering long-term commitments leading to development of quality solutions. Further, as mentioned sustaining coordination is supported by four key

areas out of which first is having the closed feedback loops. The participants highlighted the closed feedback loops help to resolve queries in distributed IS projects. According to few of the participants,

*“We are working quite hard to better coordinate and resolve queries more efficiently. Previously, we did use to conduct usual meetings and allocate tasks or give feedback, however, now post-pandemic these sort of interactions has increased a lot and we try to make conclusion out of them to avoid further delays” [P7]*

*“Feedback mechanisms help in any projects, but for distribute team members they can make a huge difference. I suggest feedback shouldn’t be just assessing and sharing your ideas back, but for me I do go through with their progress, invite customers and discuss way forwards for wrapping up tasks . . . You know there is a lot going on in the market nowadays, so, we need to more closely work to make conclusion”*

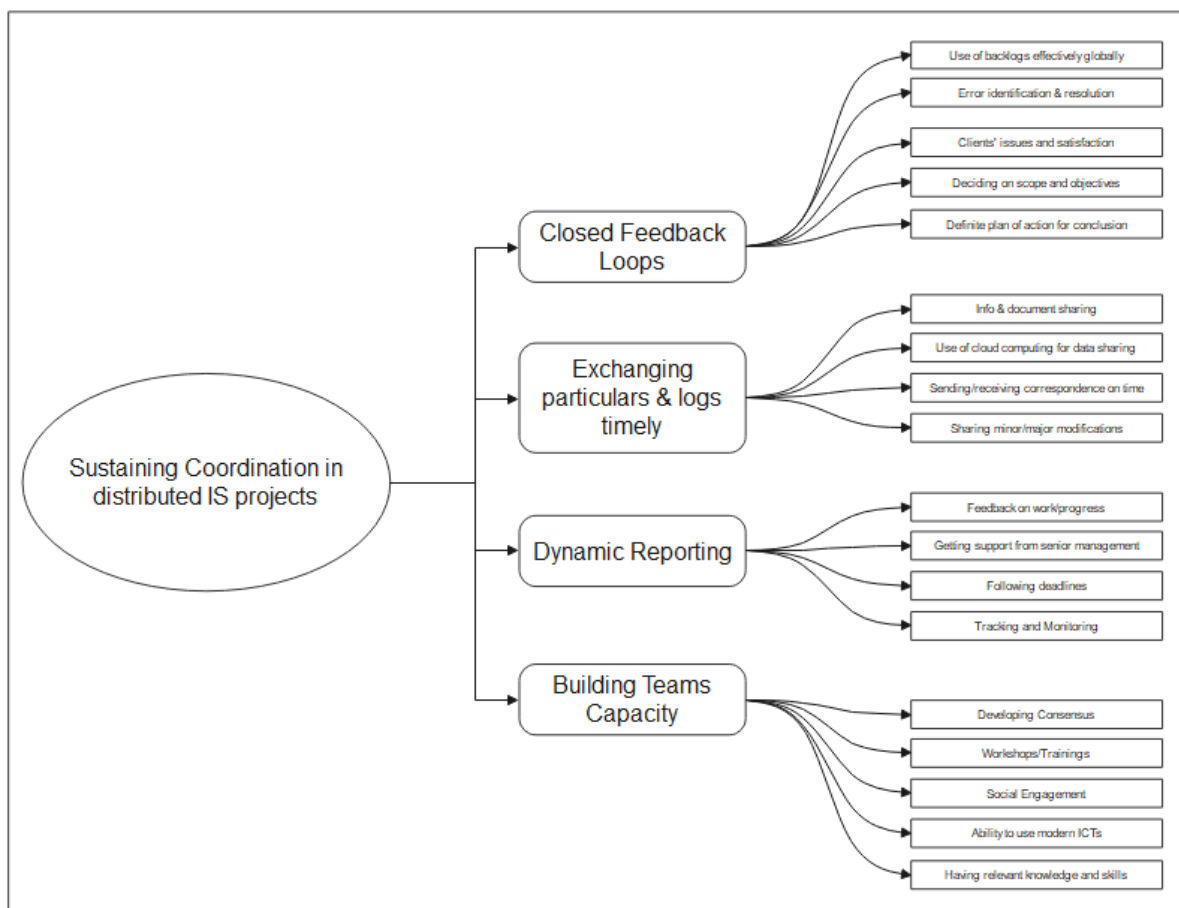


Figure 1: Thematic Diagram

The data indicates for closed feedback loops where the queries of the customers are dealt with straight away in order to maximize opportunities and reduce ambiguities. In close loop

communication, meaningful conclusions are made where the queries of the customers are dealt straight-away to maximize opportunities. Further adding to the context, Layman et al. (2006) suggest that active feedback helps to respond to alterations to minimise failures. Dorairaj et al. (2012) further suggest that the mechanism of feedback helps teams to develop an understanding of the common tasks, thus, reducing various obscurities and fears related to project work. Layman et al. (2006) proposed that for dealing with the challenges and issues of the knowledge sharing in teams, a collective code ownership should be introduced which can enhance the knowledge sharing process within the teams.

Regarding exchanging particulars and logs, the data emphasizes on the sharing precise information using various channels by highlighting that the discussion between the teams should be very specific but comprehensive so that the people having different mindsets and backgrounds should be able to recognise the ideas and notions. According to few of the participants,

*“We are completely dependent on cloud databases for document, information sharing as you know during the Covid-19 there were no other options. We are investing in our own cloud database technology to improve document sharing and arrange encrypted meetings like we do on video calls you know; it will also save additional costs”* [P17]

*“Sharing and exchange of information timely have now become crucial. As we are moving out of Covid, we have revised our engagements interactions for responding to clients’ demands. There is hell amount of back logs, work that needs to be completed, so, we are working very closely to deliver our products on time”* [P13]

Korkala and Abrahamsson (2007) further suggest that requirements exchange between the teams and customer should occur accurately as this is one of the most critical processes of software development projects. Dorairaj et al. (2012) further indicate that the sharing of information and knowledge should occur between team members on a daily basis either in meetings or through emails. Rogers (2003) acknowledges that in a social system, knowledge sharing process is crucial as several entities are involved which might restrict their ability to understand the innovations going on in the social system. Therefore, the process of exchanging particulars and logs timely should be effective enough to attain the mutual consensus of the people involved on developing issues.

Further, dynamic reporting has been added to encounter the challenges caused by delays and disruptions. The participants mentioned that tracking and monitoring of the distributed



team members' is now often done on random basis, due to the organisational pressures and economical losses faces during the closure of market during the Covid-19. This has helped to meet deadline more frequently as compared to pre-pandemic because now the teams and management work more closely. Few participants mentioned,

*“Truly, tracking of distributed teams is very important wherever they! We are not pressing anyone, but working more closely. This personally has helped my team to meet up deadlines more regularly and we are successfully managing multiple projects” [P5]*

*“Our organisation has introduced a new software which is linked to user's ID where scrum master can directly view the coding, or you can say check progress. If for some reasons, an individual or team is not up to the mark or lagging behind, scrum master intervene and support... I want to clear this system is not to disgrace but offer support without request. My team has taken this positively and we are now working more closely as a team” [P10]*

Giuffrida and Dittrich (2015) propose that reporting to a manager or supervisor on a daily basis helps to get them involved fully in the project and consequently, uncertainties can be reduced to the project work to be undertaken. Hence, dynamic reporting supports reducing liabilities where the project manager can share the advancements and differentiations of the project to the higher management for getting support. Lee and Baby (2013) further acknowledged that in global IT projects reporting to senior management within time helps to reduce the complications linked within the project processes where different sorts of experts can help management and key stakeholders to resolve the reservations.

Lastly, the data suggest that an efficient knowledge transfer process is dependent on building teams' capacity. Building teams capacity is necessary and plays a vital role in sustaining coordination to better sense the forthcoming situations and devising strategies mutually. According to few participants,

*“Distributed team management is different, no I would say very intense. You have to have availability for your team to sort out issues. Sometimes, their login, coding software stop working and I need to be available to sort out. I cannot say no or delay but try to fix as early as I can. Because if you are not fixing the issues, this would delay work and developers get upset” [P8]*

*“Agile offers a great working way where teams chose their own tasks. There are few situations in which few tasks were left and remaining team members were not keen to take on*

*work, might be due to expertise, interest or let's say for any other professional reason, I came in then to offer agreements within team and this worked well" [P11]*

Persson et al. (2009) advocate that in distributed software development projects, interactive skills can help to generate understanding among distributed members in relation to tasks and reaching a mutual consensus. Leenders et al. (2003) supports further by arguing that effective communication is the wellspring of creativity in distributed teams; therefore, the authors deduce that mutual interaction among team members help develop creativity and resolve complications within a development code.

#### **4.0 Conclusion and Recommendations**

Overall, this study uncovers many significant factors (as per figure 1) which were not discussed in the context of distributed IS projects previously. From the analysis and findings, it is evident that distributed IS projects have become more intense as we are moving into the post-pandemic world. The major reasons recognised were the high demand of IT solutions, lack of skilled workers and extensive workload.

There were two research questions defined for this study: 1) Answer to Q1: key challenges identified from analysis fall in four different areas: a) Feedback issues b) Issues related to exchanging information timely c) Lack of reporting and engagement d) Teams bonding and interaction; and 2) Answer to Q2: Based on the challenges above, a thematic diagram has been produced in Figure 1 suggesting that 'Sustaining coordination' is the solution to the challenges; sustaining coordination is about long-term and sincere commitment to work and profession without wasting time and skills. For sustaining coordination, having closed feedback loops, exchanging logs and particulars timely, Dynamic Reporting and Building Teams capacity are the four strategies used to harmonise the knowledge transfer process.

This study has theoretical and practical implications; in theory it attempts to fulfil the gap identified from the studies of Zuofa and Ochieng (2021), Keily et al. (2021), Medappa and Srivasta (2019), Gallego et al. (2020) where hardly few attempts are made to review post-pandemic norms, challenges and distributed teams' circumstances; and practically it acts as a guide for the future project managers to review the working dynamic and support distributed teams completing their projects up to the desired quality levels

## References

- Cavana, Y., Delahaye, L. and Sekaran, U. (2001) *Applied Business Research: Qualitative and Quantitative Methods*. Australia: John Wiley & Sons.
- Creswell, J. W. and Clark, V. L. P. (2011) *Designing and conducting mixed methods research*. Thousand Oaks: Sage.
- Davenport, T. and Prusak, L. (1998) *Working knowledge: How organizations manage what they know*. Boston: Harvard Business Press.
- Dorairaj, S., Noble, J. and Malik, P. (2012) 'Knowledge management in distributed agile software development', *Proceedings - 2012 Agile Conference, Agile 2012*, pp. 64–73.
- Gallego, J.S. & Ortiz-Marcos, I. & Romero Ruiz, J., 2021. "Main challenges during project planning when working with virtual teams," *Technological Forecasting and Social Change*, 162.
- Garro-Abarca, V., Palos-Sanchez, P., and Aguayo-Camacho, M. (2021). Virtual Teams in Times of Pandemic: Factors That Influence Performance. *Frontiers in Psychology*, 12.
- Giuffrida, R. and Dittrich, Y. (2015) 'A conceptual framework to study the role of communication through social software for coordination in globally-distributed software teams', *Information and Software Technology*. 63, pp. 11–30.
- He, W., Zhang, Z. J., & Li, W. (2021). Information technology solutions, challenges, and suggestions for tackling the COVID-19 pandemic. *International journal of information management*, 57, 102287.
- Hossain, E., Babar, M.A., Hye-young, P. and Verner, J. (2009) 'Risk identification and mitigation processes for using scrum in global software development: A conceptual framework', *Proceedings - Asia-Pacific Software Engineering Conference, APSEC*, pp. 457–464.
- Keshlaf, a. a. and Riddle, S. (2010) 'Risk Management for Web and Distributed Software Development Projects', *Internet Monitoring and Protection (ICIMP), 2010 Fifth International Conference on*, pp. 22–28.
- Keshlaf, A. A. and Riddle, S. (2010) 'Risk Management for Web and Distributed Software Development Projects', *Internet Monitoring and Protection (ICIMP), 2010 Fifth International Conference on*, pp. 22–28.
- Kiely, G., Butler, T. and Finnegan, P. (2021) 'Global Virtual teams coordination mechanisms: building theory from research in software development', *Behaviour and Information Technology*, 1-21.
- Korkala, M. and Abrahamsson, P. (2007) 'Communication in Distributed Agile Development: A Case Study', *33rd EUROMICRO Conference on Software Engineering and Advanced Applications (EUROMICRO 2007)*, (SEAA), pp. 203–210.
- Layman, L., Williams, L., Damian, D. and Bures, H. (2006) 'Essential communication practices for Extreme Programming in a global software development team', *Information and Software Technology*, 48(9), pp. 781–794.
- Lee, O.-K. D. And Baby, D. V. (2013) 'Managing Dynamic Risks in Global It Projects: Agile Risk-Management Using the Principles of Service-Oriented Architecture', *International*

- Journal of Information Technology & Decision Making*, 12(6), pp. 1121–1150.
- Lee, O.-K. D. and Baby, D. V. (2013) ‘Managing Dynamic Risks in Global It Projects: Agile Risk-Management Using the Principles of Service-Oriented Architecture’, *International Journal of Information Technology & Decision Making*, 12(6), pp. 1121–1150.
- Leenders, R. T. A. J., Van Engelen, J. M. L. and Kratzer, J. (2003) ‘Virtuality, communication, and new product team creativity: A social network perspective’, *Journal of Engineering and Technology Management - JET-M*, 20(1–2 SPEC.), pp. 69–92.
- Lilian, S. C. (2014). Virtual Teams: Opportunities and Challenges for e-Leaders. *Procedia - Social and Behavioral Sciences*, 110, 1251–1261.
- Medappa, P. K., and S. C. Srivastava. 2019. “Does Superposition Influence the Success of FLOSS Projects? An Examination of Open-Source Software Development by Organizations and Individuals.” *Information Systems Research* 30 (3), 764–786.
- Persson, J. S. *et al.* (2009) ‘Managing Risks in Distributed Software Projects : An Integrative Framework’, 56(3), pp. 508–532.
- Rajpal, M. (2016) ‘Lessons Learned from a Failed Attempt at Distributed Agile’. International Conference on Agile Software Development, pp. 235-243
- Reed, H. and Knight, L. V. (2010) ‘Project risk differences between virtual and co-located teams’, *Journal of Computer Information Systems*, 51(1), pp. 19–30.
- Rogers, E. . (2003) *Diffusion of Innovations*. New York: Free Press
- Zuofa, T. and Ochieng, E.G. (2021) ‘Investigating barriers to project delivery using virtual teams’ *Procedia Computer Science*, 181, 1083-1088.