Challenges and Practices for Knowledge Transfer in Global Software Development: An Updated Literature Review

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Abstract: In recent years, the evolution of technology and the increasing globalization of work have significantly transformed the software development industry. Global Software Development (GSD) has become a prevalent practice, enabling companies to reduce costs, leverage time zone differences for continuous development, and access diverse talent pools worldwide. However, knowledge transfer among distributed teams remains a significant challenge, often resulting in inefficiencies, project delays, and decreased software quality. As organizations increasingly rely on geographically dispersed teams, understanding the barriers to effective knowledge transfer in GSD is essential. This study is motivated by the need to reassess knowledge transfer in GSD, especially considering recent advancements in communication tools, collaboration platforms, and the widespread shift to remote work. While previous studies, such as those conducted by Zahedi et al. (2016), have examined knowledge transfer challenges and practices in GSD, the rapid technological and organizational shifts over the past decade necessitate an updated literature review. This work aims to provide a comprehensive overview of distributed teams' challenges in knowledge transfer and the emerging practices to address these issues. A systematic literature review was conducted, building on the work of Zahedi et al. (2016) by analyzing research published between 2014 and 2024. The study followed a rigorous research protocol, utilizing the Scopus database to identify relevant papers and extract key insights. The findings highlight persistent challenges, including communication barriers, cultural differences, time zone constraints, and difficulties managing knowledge within distributed teams. Social and organizational factors hinder effective knowledge transfer, such as a lack of trust and inadequate coordination. The literature points to several best practices for facilitating knowledge transfer, including on-site visits for remote employees, synchronous and asynchronous communication tools, structured documentation, training programs, and establishing communities of practice. This study contributes to the field by offering an updated perspective on knowledge transfer in GSD, providing valuable insights for organizations aiming to optimize their global collaboration strategies. Future work should compare these findings with previous studies to track the evolution of knowledge transfer practices over time and explore new organizational approaches that have emerged in response to the changing dynamics of distributed software development.

Keywords: Global software development, Knowledge management, Communication barriers, Distributed teams, Collaboration practices, Systematic literature review

1. Introduction

Global Software Development (GSD) refers to building software products using development teams distributed across different world regions (Niazi et al., 2016). This approach is often chosen for its potential to reduce production costs, leverage different time zones to accelerate development, and access the diverse skillsets of professionals worldwide (Conchúir et al., 2009; Damian & Moitra, 2006; Niazi et al., 2016). However, effective knowledge transfer between teams remains a significant challenge in distributed development (Niazi et al., 2016; Parviainen & Tihinen, 2014), and if not properly managed, may undermine these benefits by resulting in low-quality software products (Niazi et al., 2016).

Studies by Damian and Moitra (2006) and Lanubile et al. (2003) show that GSD has been practiced and studied since the early 21st century. Since then, technological advancements have led to the development of tools that facilitate communication among geographically distributed individuals via the web. With greater access to high-speed internet, tele/videoconferencing applications and instant messaging tools have become widely used. Furthermore, documentation and collaborative sharing platforms have enabled the construction and exchange of knowledge in various formats. More recently, in the early 2020s, significant changes have reshaped how

teams operate, particularly due to the widespread shift of organizational human capital toward remote work starting in 2020.

Given these changes, it is necessary to assess the current state of knowledge management in GSD. Zahedi et al. (2016) conducted a literature review on the subject, covering the period from 2000 to 2014. The present study aims to update that review by offering an overview of the practices and challenges of knowledge transfer in GSD from 2014 to 2024.

2. Methodology

This study presents an updated version of the review conducted by Zahedi et al. (2016), extending it to the present day and following the original research methods, with some modifications. This section introduces a framework for validating the updated review, followed by the research protocol and the results of its implementation.

2.1 Validation of the Update

This subsection documents the application of the framework proposed by Garner et al. (2016) to assess the need to update the literature review conducted initially by Zahedi et al. (2016). The results of this validation were positive, supporting the relevance and timeliness of conducting a new review. The analysis followed the three-stage process outlined in the framework.

In the first stage, the original review was evaluated based on its current relevance, impact, and methodological rigor. The topic remains pertinent, especially considering the global shift to remote work in 2020, which further consolidated distributed work practices and spurred the development of improved tools and new communication methods enabled by technological advances. The original review has also demonstrated considerable impact, with 156 citations indexed in Scopus and 571 readers registered on Mendeley, indicating sustained academic interest. Methodologically, the study was well-structured, with a clearly defined protocol that included research objectives, guiding questions, a selection of Scopus as the primary data source (justified by its role as an indexing aggregator for multiple relevant databases), filtering criteria, a data extraction form, and a synthesis approach. The documentation of results was also satisfactory, offering both demographic and thematic analyses.

Given the positive evaluation across all criteria in the first stage, the second stage involved verifying the existence of new studies or emerging information since the publication of the original review. A preliminary search in Scopus covering the period from 2014 to May 2024 identified 771 new studies, confirming the presence of significant additional material.

In the third stage, the potential impact of these new studies on the findings, conclusions, or credibility of the original review was assessed. Although definitive conclusions require further analysis, the substantial changes in the global landscape of remote work in recent years suggest that knowledge management practices in GSD have evolved, potentially altering previous insights. Given these findings, the decision to proceed with an updated review is justified and aligned with the framework's recommendations.

2.2 Research Protocol

This study aims to provide an updated overview of the practices and challenges of knowledge transfer in current GSD. The research questions of this review remain the same as those proposed by Zahedi et al. (2016) and are as follows:

- **RQ1**: What are the knowledge-sharing challenges in GSD?
- **RQ2**: What are the knowledge-sharing practices in GSD?
- **RQ3**: In which contextual configurations (i.e., research methodology and organizational context) are these challenges and practices reported?

To ensure consistency with the original review, Scopus was selected as the sole database for article retrieval, both to maintain methodological alignment and due to its widespread use in this type of research (Zhu & Liu, 2020). Only articles published from 2014 onwards, up to the search date, were considered. Eligible works had to belong to one of the following subject areas: *Computer Science*, *Business, Management and Accounting*, *Decision Sciences*, or *Economics, Econometrics, and Finance*. Table 1 presents the original search string.

Table 1: The search string

Search String
TITLE-ABS-KEY ((“global software development” OR “collaborative software development” OR “global software engineering” OR “distributed software development” OR “distributed software engineering” OR “offshore software development” OR “offshore software engineering” OR “geographically distributed software development” OR offshor* OR “software outsourcing” OR “software outsource” OR “globally distributed software development” OR “offshore outsourcing” OR “Dispersed teams” OR “distributed teams” OR “virtual teams” OR “globally distributed work” OR “global software teams” OR outsour*) AND (“knowledge transfer” OR “knowledge shift” OR “knowledge exchange” OR “knowledge distribution” OR “tacit knowledge” OR “explicit knowledge” OR “knowledge transfer process” OR “knowledge flow” OR “organizational knowledge” OR “knowledge acquisition” OR “knowledge management” OR “knowledge creation” OR “knowledge sharing” OR “knowledge retention” OR “knowledge valuation” OR “knowledge use” OR “knowledge application” OR “knowledge discovery” OR “knowledge integration” OR “knowledge theory” OR “knowledge engineering” OR “experience transfer” OR “technology transfer”) AND (risk* OR challenge* OR tool* OR method* OR problem* OR challeng* OR barrier* OR “best practices” OR model* OR techniq* OR strateg* OR approach* OR process* OR solution* OR obstacle* OR “risk analysis” OR effect* OR “risk factors” OR selection* OR mechanism* OR assessment* OR “evaluation process” OR practice* OR mitigate*))

For each selected article, the following data were extracted to support the creation of visual elements aimed at answering RQ3: **Author(s), Year of Publication, Title, Venue, Citation Count (Scopus), Research Method, Data Collection Method(s), Data Analysis, Units of Analysis, Study Context, Site Locations, Collaboration Model(s), Organization Size, and Media/Tools Used.**

To answer Research Questions 1 and 2, the articles underwent **thematic analysis** (Braun & Clarke, 2006) to identify challenges and practices related to knowledge transfer in GSD. The analysis followed these steps:

- Reading of the article;
- Annotation of potential codes;
- Grouping of codes and identification of themes;
- Segmentation of articles by identified themes; and
- Reporting of results.

2.3 Protocol Execution

The search in the Scopus database was conducted in May 2024. Filters were applied in the tool to limit the results by publication year, language, and subject areas. A total of 771 results were returned. Figure 1 presents details of the article selection process. Table 2 provides the list of selected articles along with their associated identifiers. After selection, the articles were organized in a spreadsheet, where their metadata was extracted. The thematic analysis was conducted by directly annotating the article files. Grouping and reporting of themes were performed using a text editor.

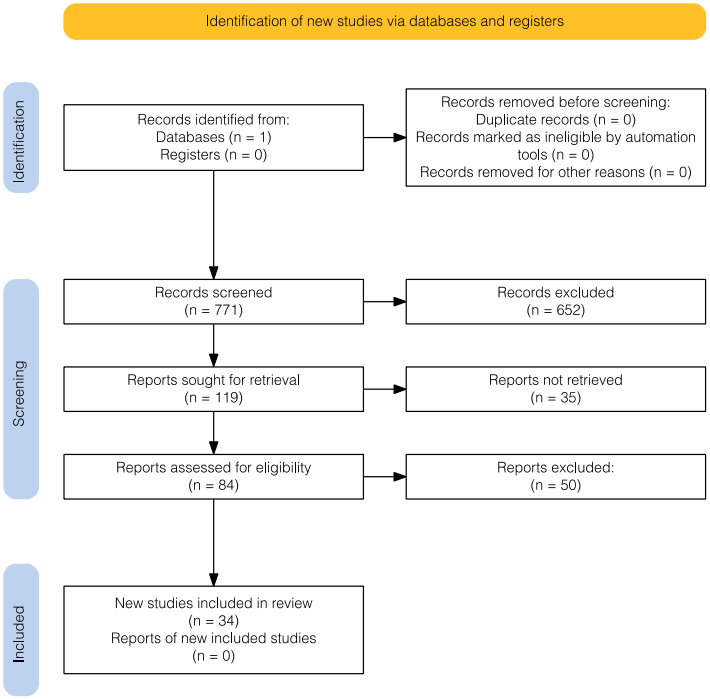

Figure 1: Article selection flow

Table 2: Selected studies after applying inclusion and exclusion criteria

ID	Year	Truncated Title	Reference
A1	2014	Navigating the mutual knowledge problem: a comparative…	(Koppman & Gupta, 2014)
A2	2014	Towards an understanding of enabling process knowing in…	(Zahedi & Babar, 2014b)
A3	2014	Knowledge transfer in IT offshoring relationships: the roles…	(Zimmermann & Ravishankar, 2014)
A4	2014	The four' W's of face-to-face: suggesting an enriched…	(Stetten et al., 2014)
A5	2014	Knowledge transfer in offshore outsourcing software…	(Betz et al., 2014)
A6	2014	Integration by communication: knowledge exchange in…	(Kristjánsson et al., 2014)
A7	2014	The Knowledge-Bridging Process in Software Offshoring…	(Nguyen et al., 2014)
A8	2014	Knowledge sharing for common understanding of technical…	(Zahedi & Babar, 2014a)
A9	2014	Knowledge-related challenges and solutions in GSD	(Parviainen & Tihinen, 2014)
A10	2014	From offshore outsourcing to insourcing and partnerships…	(Moe et al., 2014)
A11	2014	Vendors' team performance in software outsourcing projects	(Qu et al., 2014)
A12	2015	Riding for a Fall in Outsourced ISD	(Alanne & Pekkola, 2015)
A13	2014	Networking in a large-scale distributed agile project	(Moe et al., 2014)
A14	2015	An Empirical Study of Offshore Software Development	(Consoli et al., 2015)
A15	2015	Knowledge Management in Distributed Agile Software…	(Razzak et al., 2015)
A16	2015	Communication and personality profiles of global software…	(Licorish & MacDonell, 2015)
A17	2015	Knowledge Management in Globally Distributed Agile…	(Razzak & Mite, 2015)
A18	2015	You Feel The Threat From Asia	(Blomqvist et al., 2015)
A19	2017	Tool-supported continuous business process innovation	(Heredia et al., 2017)
A20	2017	Knowledge sharing for agile distributed teams	(Gervigny & Nagowah, 2017)
A21	2016	Why does site visit matter in global software development	(Zahedi & Babar, 2016)
A22	2019	Investigation of Knowledge Sharing Behavior in Global…	(Anwar et al., 2019)
A23	2018	Prioritizing challenges of agile process in distributed…	(Shameem et al., 2018)

ID	Year	Truncated Title	Reference
A24	2019	A Survey on Agile Practices and Challenges of a Global…	(Lautert et al., 2019)
A25	2018	Knowledge transfer in IS offshoring	(Strasser et al., 2018)
A26	2019	Improving Knowledge Sharing in Distributed Software…	(Waheed et al., 2019)
A27	2021	Knowledge management, sharing, and transfer in…	(Patel et al., 2021)
A28	2021	Determinants of trust in computer-mediated offshore…	(Cheng et al., 2021)
A29	2021	An Empirical Investigation of Pull Requests	(Stray et al., 2021)
A30	2020	Asynchronous Collaboration	(Sangwan et al., 2020)
A31	2021	Understanding the relation between repeat developer…	(Datta et al., 2021)
A32	2023	The Role of Responsiveness to Change in Large…	(Smite & Moe, 2023)
A33	2023	Determinants of success and failure of knowledge transfer	(Strasser et al., 2023)
A34	2023	Developing a knowledge-based perspective of coordination	(Mishra, 2023)

3. Descriptive Insights into GSD Literature

This section offers a descriptive overview of the selected studies to characterize the general research landscape on GSD. It examines the temporal distribution of publications, the tools and media adopted for knowledge sharing, and the contextual settings in which GSD initiatives occur. These insights help contextualize the reviewed literature's empirical and methodological foundations.

3.1 Demographic Attributes

The distribution of publications by year shows a declining trend in the number of studies on the topic, with a peak in 2014—the first year included in this review—and no publications recorded in 2022 or from January to May 2024. Publications from the 2010s represent 76.5% of the total, while those from the 2020s account for 23.5%, indicating a decrease in research output in recent years.

The distribution of tools and media mentioned in the selected studies that support knowledge sharing in GSD was grouped into three categories based on their primary function: coordination, organizational memory, and project management. Each tool was considered only once per article, regardless of whether multiple case studies were included. Coordination tools were the most frequently mentioned, reflecting an apparent concern with enabling effective communication in distributed settings to support knowledge sharing.

Email was the most cited tool in the coordination tools, serving as a common channel for asynchronous communication. However, when grouped, real-time communication tools—such as videoconferencing, Skype, telephone, chat, and teleconferencing—appear more frequently than email alone. This finding suggests a growing emphasis on synchronous communication, likely influenced by advances in web-based data transmission technologies and the demands of distributed work environments.

Regarding organizational memory, Wiki and SharePoint were the most frequently used platforms, highlighting the importance of maintaining shared documentation for effective knowledge management. Tools such as JIRA, digital boards, Redmine, and Confluence were the most cited for project management, underscoring the significance of tracking task execution in distributed teams. Additionally, Git was referenced in four studies, indicating its relevance for code versioning and the maintenance of updated development artifacts.

3.2 Contextual Configurations

The collaboration models identified in each case study were offshore, nearshore, and insourcing. In this context, *offshore* refers to development in a different country; *insourcing* denotes a situation where a single organization conducts development activities in another location; and *outsourcing* involves delegating tasks from one organization to another (Zahedi et al., 2016). Additionally, this study adopts the definition of *nearshore* proposed by Carmel and Abbot (2007), which refers to development conducted in countries geographically closer to the headquarters, typically sharing cultural similarities despite being distinct nations.

The most frequently adopted model was offshore outsourcing, cited in 47 case studies. The nearshore-outsourcing model was only considered when the studies explicitly mentioned using characteristics specific to this modality, making it the second most cited collaboration model.

In most cases, the size of the studied organization was not explicitly stated in terms of organizational size. However, when available, there was a notable focus on large organizations, which accounted for 25.8% of the cases, followed by medium-sized companies. The classification of organizational size followed the descriptions provided in the studies; when only the number of employees was indicated, the OECD (Organisation for Economic Co-operation and Development) classification was applied.

Table 3 details the geographical distribution of participating entities—clients and providers—in GSD cases. India was the most prominent country, involved in 18 studies, followed by Germany and Sweden, each in 13 cases. European countries were represented in 55 studies, while Asian countries participated in 26, highlighting the global nature of the software development landscape and the concentration of activity in specific regions.

Table 3: Geographical distribution of participating entities in GSD case studies.

Count	Countries
18	India
13	Germany, Sweden
7	United States
6	Ukraine, Bangladesh
5	Norway, China
3	Russia, Denmark, Pakistan, Serbia, Netherlands
2	Belarus, Switzerland, Latvia, Brazil, Poland
1	Finland, Japan, Philippines, Italy, South Korea, Australia, Ireland, Canada, Croatia, Vietnam

4. Knowledge Sharing in GSD: Challenges and Practices

Building on the publication trends and tool-usage patterns observed in Section 3.1 and the collaboration models mapped in Section 3.2, we now examine how these descriptive foundations inform the core challenges and practices in global software development. This section presents the results of a thematic analysis focused on knowledge sharing in GSD. It explores the challenges reported in the literature and the practices adopted to overcome them. By organizing the findings into recurring themes, this section highlights how knowledge is managed across distributed environments and identifies patterns that inform future research and practice.

4.1 Challenges in Knowledge Sharing in GSD

One of the most frequently cited challenges is the lack of effective communication. As observed in Section 3.1, real-time communication tools outnumber email in frequency, yet many projects continue to rely heavily on asynchronous channels such as email. Several studies highlight coordination problems stemming from misunderstandings in communication (ID 01) and reluctance to engage in electronic interactions (IDs 01, 09, 33). Language barriers are commonly mentioned (IDs 03, 04, 05, 07, 12, 13, 15, 18, 20, 22, 33), with issues such as accents and region-specific comprehension affecting clarity. The absence of adequate feedback (ID 23) and difficulties articulating and understanding priorities across different sites (ID 09) further hinder communication. In addition, the lack of face-to-face interaction (IDs 01, 02, 05, 22, 24) and the limitations of electronic communication (IDs 01, 02, 08, 09, 11, 12, 15, 23, 24, 25, 33) are reported as significant obstacles to smooth collaboration.

Cultural differences also emerge as a critical issue in GSD (IDs 03, 04, 05, 07, 08, 09, 10, 11, 15, 18, 23, 25, 29, 30). Section 3.2 revealed that 47 out of 67 case studies use offshore outsourcing, where teams are geographically distant and culturally diverse. These differences manifest in varying understandings of career goals, professional backgrounds, and communication styles, for example, the level of detail considered necessary when conveying information. Such disparities influence behavior and attitudes toward tasks, ultimately complicating collaboration and decision-making processes (IDs 03, 08, 10, 25).

Time zone differences and geographical distance present additional challenges. Several studies note the difficulty in scheduling synchronous activities and meetings due to non-overlapping work hours (IDs 01, 05, 10, 13, 20, 22, 24, 30). Teams in different regions are available at different times, reducing real-time interaction windows. Geographic distance further limits face-to-face engagement due to the high cost of travel, reducing informal communication opportunities and hampering relationship-building (IDs 01, 05, 12, 22).

Issues related to knowledge sharing and management are also prominent. The lack of proper documentation and the risk of knowledge loss are mentioned in several studies (IDs 12, 26, 33), often attributed to inadequate tools (e.g., exclusive use of chat applications), absence of knowledge retention plans, or high employee turnover in distributed teams. The difficulty of sharing knowledge across sites is frequently reported (IDs 05, 09, 10, 12, 29, 30, 33), with variability in understanding project architecture, domain knowledge, and even the product itself, often influenced by cultural factors. Furthermore, the lack of awareness regarding the skills of professionals at other sites (IDs 09, 29) is cited as a bottleneck that hinders project progress.

Coordination and project management pose specific challenges in the global context. Given the dominance of large organizations in nearshore-outsourcing cases (Section 3.2), unclear roles and responsibilities (ID 23) and a lack of managerial involvement (IDs 09, 23) become more pronounced, resulting in delayed task interdependencies and monitoring issues. Difficulties in estimating and monitoring project progress (ID 09). Another recurring issue is the failure to identify, consider, and communicate task interdependencies (ID 09), which can significantly delay or disrupt project execution.

Lastly, the lack of social interaction and trust hinders effective knowledge sharing. Several studies emphasize the absence of informal interactions and difficulty building trust (IDs 01, 03, 05, 08, 25, 28, 33). As detailed in Section 3.2, reported trust issues in offshore scenarios are primarily concentrated in Europe and India, underscoring the difficulty of establishing trust in these contexts. Communication insecurity and reluctance to share information openly are noted (IDs 03, 08, 33), as a lack of trust in unfamiliar team members and uncertainty over whether others have correctly understood the requirements. This unfamiliarity often leads collaborators to avoid asking questions or participating actively in online meetings.

4.2 Knowledge-Sharing Practices in GSD

A common and foundational practice involves using general communication tools for knowledge exchange. Emails (IDs 01, 24, 26, 30) are widely used for formal communication, offering traceability and the ability to document short and long discussions. Instant messaging and videoconferencing platforms (IDs 15, 17, 24, 26, 28) are employed for real-time communication, facilitating immediate interaction, along with teleconferencing and phone calls (IDs 03, 24). This shift reflects the tool-usage profile noted in Section 3.1, where synchronous platforms outpace email in the studies we reviewed. Meetings—in-person or virtual (IDs 02, 06, 15, 17, 24, 25, 29)—are used for alignment, progress reviews, and problem-solving. Discussion forums (IDs 01, 13, 15, 17) and microblogs (ID 19) are also cited as hybrid tools that combine communication and documentation functions. Some studies mention the deliberate creation of informal and open communication moments (ID 08) and the assignment of dedicated communication facilitators (ID 12) to support knowledge exchange.

Training and workshops are also important mechanisms for facilitating knowledge sharing. Both in-person and online training sessions (IDs 04, 06, 07, 10, 17, 32, 33) are reported as valuable for equipping employees with business domain knowledge and technical skills. Workshops (IDs 02, 17, 21, 22, 33) are collaborative environments for sharing experiences and discussing complex topics. Introductory training (ID 06) is particularly emphasized for onboarding new employees and integrating distributed teams. Cultural workshops (ID 22) are also noted for easing multicultural integration.

Face-to-face visits and expatriation strategies are frequently mentioned as effective means to strengthen relationships and improve understanding of local work contexts. Site visits (IDs 02, 03, 04, 05, 06, 08, 10, 13, 15, 17, 18, 21, 25, 29, 32, 33) contribute to resolving communication issues and building trust among team members. Expatriation (ID 27), where employees from different locations work together over extended periods, enables deeper knowledge exchange and relationship development. Managerial visits to remote sites (ID 04) and visits to foster personal relationships (ID 10) are also highlighted as valuable practices.

Organizational culture plays a key role in shaping knowledge-sharing behavior. The formation of communities of practice (IDs 02, 13) is used to encourage ongoing learning and exchange among team members. Multicultural integration efforts (ID 14) and socialization through events (IDs 04, 08) support the development of a cohesive work environment. The deliberate formation of multisite teams (IDs 10, 18) aims to promote intercultural interaction and leverage diversity to enhance communication. Fostering direct communication and adapting team and managerial cultural practices enables knowledge exchange.

Lastly, documentation practices and knowledge artifacts are crucial for ensuring that knowledge remains accessible and is preserved over time. Tools such as wikis and other collaborative documentation platforms (IDs 01, 08, 17, 18, 19, 20) help maintain knowledge repositories that can be consulted by team members as needed. The creation and availability of documented knowledge artifacts (IDs 07, 08, 17, 32), including collective

documentation practices (ID 01), are recognized as effective methods for preserving and disseminating knowledge within distributed development environments.

4.3 Comparison with Zahedi et al. (2016)

Our updated review builds upon the thematic framework established by Zahedi et al. (2016), categorizing challenges into management, team structure, work processes, team cognition, social attributes, and technology, and grouping practices around collocation, boundary spanning, communication routines, documentation, cognition-supporting mechanisms, and socio-technical enablers. Whereas Zahedi et al. analyzed 61 studies through September 2014, our review examines 34 studies from 2014 to 2024, reflecting the pandemic's impact on remote work and advances in synchronous collaboration tools. Zahedi et al. reported a steady increase in publications up to 2014; in contrast, we observe a plateau and slight decline after 2017, with no publications in 2022 or early 2024. This pattern signals a shift from methodological standardization and tool experimentation toward a deeper focus on hybrid and post-pandemic collaboration.

Methodologically, we retained Scopus as our primary database but broadened our search terms to include "knowledge management" and "knowledge sharing." This change yielded only 11 overlapping articles with Zahedi et al.'s set and highlighted evolving terminology and new empirical contexts, especially nearshore and hybrid teams in non-Western settings.

Whereas Zahedi et al. observed that technology-related challenges were underreported, we find that modern tool ecosystems—integrated chat-wiki platforms and expertise browsers—now appear prominently as both challenges and practices. Furthermore, whereas the original review called for more research on small and medium-sized enterprises (SMEs), we document a growing number of SME-focused case studies. This comparison confirms continuity in core themes while revealing a shift toward richer, technology-mediated, and context-sensitive knowledge-sharing investigations in global software teams.

5. Conclusion

Although distributed software development and remote work have become ubiquitous, accelerated by the COVID-19 pandemic, our review shows that organizations still grapple with well-known challenges such as communication breakdowns, cultural mismatches, time-zone barriers, and trust deficits. At the same time, face-to-face visits, targeted training, structured documentation, and coordination tools continue evolving, reflecting technological advances and enduring human factors.

Building on Zahedi et al. (2016), this updated systematic literature review covers studies from 2014 through early 2024, following a transparent Scopus-based protocol. We provided a descriptive overview of publication trends, tool usage, and collaboration models, and conducted a thematic analysis of challenges and practices. Notably, coordination tools—and increasingly synchronous media—dominate knowledge-sharing strategies, while offshore outsourcing remains the prevalent collaboration model. Our findings offer continuity with past research and fresh insights into how global teams negotiate distance, culture, and technology.

As a contribution, this work delivers a comprehensive synthesis of the past decade's research on knowledge transfer in global software development. Practitioners will find actionable guidance on selecting and combining tools, structuring interventions (e.g., site visits, workshops), and preparing for context-specific hurdles. For researchers, the review establishes a detailed baseline against which future longitudinal or meta-analytic studies can be compared, particularly as hybrid and post-pandemic work patterns emerge.

By reinforcing this field's theoretical and practical contours, our review maps where we stand today and signals where the next generation of studies should venture—examining underexplored contexts, testing evidence-based solutions, and measuring long-term impacts. Ultimately, this review serves as both a roadmap for practitioners seeking to optimize distributed collaboration and a foundation for scholars aiming to chart the evolution of knowledge transfer in an ever-more-connected world.

Ethics Declaration: Ethical clearance was not required for the development of this research.

AI Declaration: AI tools such as Grammarly and ChatGPT were used solely for language revision. The authors' analysis and interpretations are their own.

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