

ENHANCING TASK RELATED KNOWLEDGE SHARING IN AGILE VIRTUAL TEAMS: FROM INFLUENCING FACTORS TO PRACTICAL GUIDELINES – KSAVT FRAMEWORK

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ABSTRACT

Task-relevant knowledge sharing (TaRK) is an essential process in maintaining alignment, collaboration, and learning within geographically dispersed teams in distributed agile environments. Established on the existing Knowledge Sharing for Agile Virtual teams (KSAVT) Framework, this study clarifies the role of task-level practices in ensuring effective knowledge sharing and improving collective performance. Based on a qualitative multiple case study of three international software organizations and eight practitioners, the research validates seven task-related influencing factors (IFs) and offers eight practical guidelines that put these influencing factors into practice in real-world agile settings. The results suggest that sustaining knowledge sharing in distributed agile environments depends on open communication, workload sharing, repeated reflection, and relevant filtering. In theory, the study adds to the KSAVT Framework by showing how efficient task related knowledge sharing can convert an individual's capacity of doing a task into team's capability. In practice, it gives agile teams clear steps to make task related knowledge sharing a part of their daily routine, which helps them become more flexible, learn faster, and work better together. Consequently, task-oriented knowledge sharing becomes an active, iterative process that turns everyday work into learning loops, promoting adaptability and sustained team performance.

Keywords: *Agile Virtual Teams (Avts), Task Related Knowledge (Tark), Knowledge Sharing, Influencing Factors (Ifs), Industrial Case Study, Global Software Development (GSD), Knowledge Sharing For Agile Virtual Teams (KSAVT) Framework.*

1. INTRODUCTION

In Agile Virtual Teams (AVTs), when members of the team work both geographically and across time, tackling task related knowledge (TaRK) is the key to productivity, alignment, and shared responsibility of the results [1]. Self-organization and shared accountability are the cornerstones of Agile; however, remote environments often make communication at work, transfer of experience activities, and coordination of problem-solving attempts difficult. Inadequate sharing of knowledge of tasks leads to duplication of effort, misconceived requirements, and lack of uniform improvement in a sprint [2].

This paper expands on the earlier confirmed KSAVT Framework, with the focus on the Task-Related Knowledge (TaRK) of the framework. The

previous stages of the framework established seven influential factors (TaRK17), which include aspects such as the clarity of requirements, shared ownership of tasks, decision-making support, and continuous learning [3]. This is the basis of the current research which examines the ways in which these factors can be reflected in agile industrial settings and how they can be operationalized into a practical routine [3]. Based on the data gathered in one of the industrial case studies, eight practical guidelines are developed to improve task related sharing of knowledge within distributed teams. These guidelines; like promoting why task are important, sharing tasks, encouraging open discussion, and refining tasks; turn theoretical ideas into real, collaborative action.

While there's a lot of research on knowledge sharing for remote agile teams, most of it focuses on high-

level processes or tools. It often overlooks the small, daily task habits that define how a team collaborates. This leaves a gap: we don't fully understand how specific actions related to tasks affect knowledge sharing, or how to create practical, repeatable guidelines for companies to use. This study fills that gap by testing the task-focused part of the KSAVT Framework with real-world data, turning theory into practical strategies for agile teams.

To further position this study within the broader academic discourse, the following section reviews existing literature on knowledge sharing and task-related practices in agile virtual teams, identifying key insights and gaps that underpin the current research.

2. RELATED WORK

In agile and distributed software development environments, knowledge sharing (KS) is still a critical factor of team performance [3]. Task-related knowledge (TaRK) plays a very important role in this milieu as it links personal input with group goals and makes it easier to recycle experiences gained during prior work [4]. However, the dispersed nature of Agile Virtual Teams (AVTs) poses complex issues in terms of the acquisition, meaning, and sharing of task knowledge that cross both temporal and cultural boundaries [5].

Past studies emphasize that ambiguity reduction and proper coordination cannot be achieved without a common understanding of tasks such as the requirements, dependencies, and technical solutions [6]. In cases where the requirements are not properly comprehended or they are assumed, distributed teams face conflicting priorities and duplication of efforts [7]. Guidelines on task deliberation and experiential exchange have proven to be very useful in mitigating these hindrances, hence, increasing task ownership and teamwork [8].

The empirical studies on self-organizing agile teams also emphasize the importance of autonomy and shared responsibility in the choice and implementation of tasks [4]. When team members choose their own tasks, they feel more motivated and responsible. Tools like retrospectives, peer reviews, and discussion forums also help them learn and reflect continuously [4,5]. However, these studies often look at these tools separately. They describe what happens but don't show how these practices work together to share knowledge about tasks. Also, relying too much on casual talk can lead to confusion about tasks and inconsistent decisions,

especially in teams spread across different places [4,5].

Current knowledge sharing frameworks in software engineering mostly focus on processes or technology, like communication tools and documentation [6]. They don't look enough at the small, daily task interactions that are crucial for teamwork and learning. This limited view makes them less useful in situations where unspoken, task-specific interactions are very important. Also, while older frameworks point out general ways to share knowledge, they often don't have real-world proof from companies, making their practical use unclear [6].

This study tackles these problems by looking closely at Task-Related Knowledge (TaRK), which is a key element but is often overlooked. It validates seven influencing factors and also creates eight practical guidelines, based on evidence, that connect theory with real-world application. These findings show how to manage task related knowledge effectively and how individual skills can become shared team knowledge, helping both academics and industry. Having identified the gap in task related knowledge sharing, this study employs a qualitative case study methodology, which is discussed in the next section, to explore how these factors manifest in real agile environments.

3. METHODOLOGY

This study used a qualitative case study method to analyse how remote agile teams share and manage task-related knowledge (TaRK) in their daily work [9]. This method allowed the researchers to deeply explore how teams work together socially and within their organizations, capturing the real complexity of knowledge sharing without forcing any assumptions.

Three international software companies were chosen for this study because they were experienced in agile methods, used remote teams, and actively collaborated online. To get a range of viewpoints, eight people from these companies were interviewed, including Scrum Masters, developers, and project coordinators. In addition to the interviews, the study also reviewed documents and project materials (like sprint reports and chat logs) to confirm the findings and make sure they were accurate.

The data is analysed by finding and coding common themes [10]. The analysis starts with the

seven task-related factors (TaRK1–7) already defined in the KSAVT Framework. By repeatedly comparing the different cases, the researchers found the patterns to eventually refine and validate each of the influencing factors with real evidence [11, 12].

The goal of this analysis was to validate the seven TaRK influencing factors from the KSAVT Framework and to create practical guidelines showing how to use them in real remote agile teams, while the research objectives of this study have been presented in the following subsection.

3.1. Research Objective (RO)

The research objectives for this study have been presented below;

- To validate the seven task-related knowledge (TaRK) influencing factors from the KSAVT Framework in the context of distributed agile teams.
- To develop practical guidelines demonstrating how these influencing factors can be effectively applied in real-world remote agile team settings.

Based on these research objectives, the following research questions were formulated to guide the study and address the key aspects of task-related knowledge sharing in distributed agile teams.

3.2. Research Questions (RQs)

- RQ1: How do task-related influencing factors (TaRK 1–7) enable effective knowledge sharing in distributed agile teams?
- RQ2: How do the identified industrial guidelines operationalize these factors to make task-related knowledge sharing more efficient and collaborative?

The following section outlines the results of the case study by presenting the validation of TaRK factors and the derivation of actionable guidelines for agile virtual teams.

4. RESULTS

The data obtained from three industrial case studies was validated using the thematic analysis to validate the seven Task-Related Knowledge (TaRK) Influencing factors of the KSAVT Framework. The validation was performed by cross-comparing coded interview data, project artefacts, and team documents for each IF's evaluation and usage in daily AVT practices. The resultant themes were compared with the identified TaRK IFs for validity. The validated seven Task-Related Knowledge (TaRK) influencing factors are presented in Table 1.

Table 1 Task Related Influencing Factors - KSAVT Framework

IF Sr. No.	Task Related Knowledge Influencing Factors
TaRK 1	Avoid the problem of poorly understood requirements and technical solutions
TaRK 2	Share experience to help complete the task
TaRK 3	Focus on shared responsibility
TaRK 4	Share Solutions for existent
TaRK 5	Enable everyone to pick their own tasks
TaRK 6	Aid into decision-making and problem
TaRK 7	Focus on continuous learning

Furthermore, the study established eight actionable guidelines that together strengthen task-level knowledge sharing (KS) within Agile Virtual Teams (AVTs). The guidelines are presented in Table 2.

Table 2 Guidelines for TaRK IFs - KSAVT Framework

#	Guidelines for TaRK	Source
1	Importance of Task	2, 3
2	Task sharing (high workloads)	1, 2, 3

#	Guidelines for TaRK	Source
3	Welcome Questions	2, 3
4	Welcome differing opinions	1, 2
5	Discussion forums about every task	1, 3
6	Welcome Ideas from others	1, 3
7	Iterations based on related tasks	1, 2, 3
8	Share only relevant task related knowledge	1, 2, 3

The results show that the ability to clearly communicate, coordinate, and reflect on task-related work directly affects team cohesion, learning, and performance across distributed agile environments. The following subsection provides the validation of task related influencing factors.

4.1. Validation of Task Related Influencing Factors

The case study results confirmed that the TaRK influencing factors are embedded in daily agile operations and shape how teams collaborate and learn. However, the organizational culture, technological infrastructure, and nature of projects also play a vital role in efficient adaptation of these IFs.

- TaRK 1 – Avoid poorly understood requirements and solutions:

Teams emphasized the need for early clarification of task goals and technical expectations. Misinterpretations during sprint planning were identified as a major barrier to efficiency, reinforcing the importance of shared understanding before execution [13]. One Scrum Master expressed, “When requirements are not clearly specified, half the sprint is spent in figuring out what was required rather than building what was needed.”

- TaRK 2 & TaRK 3 – Experience sharing and shared responsibility:

Teams that frequently exchanged personal experiences and fostered collective task ownership demonstrated faster issue resolution and higher quality outcomes. Shared responsibility cultivated accountability and reduced bottlenecks [14]. A developer explained, “With the sense of collective

ownership within the AVT members, people naturally assist each other when a problem comes up”.

- TaRK 4 – Sharing solutions for existing problems:

Knowledge reuse was commonly practiced through retrospectives and discussion boards. Teams that maintained searchable repositories of past solutions reported fewer repeated mistakes [15]. However, according to one project manager, some team members consider maintaining knowledge repositories a complex task owing to the time constraints.

- TaRK 5 – Task autonomy:

Allowing individuals to select tasks based on expertise improved motivation and performance. However, autonomy worked best when accompanied by open coordination to prevent redundancy [16]. According to one source pointed out that lightweight coordination checkpoints, though hamper autonomy, are yet useful in avoiding redundancy and unnecessary efforts.

- TaRK 6 – Support for decision-making:

Decision-making benefited from transparent discussions in sprint reviews and stand-ups, where multiple viewpoints were welcomed. This openness improved both technical and non-technical problem-solving [17]. AVTs, with culture of hierarchal decisions, at first experienced a significant problem with embracing the open deliberation. Thus, one source emphasized that team culture plays a significant role in making this aspect apparent.

- TaRK 7 – Continuous learning:

Iterative reflection through sprint retrospectives was consistently highlighted as a mechanism for team learning, enabling adaptation and skill enhancement over time [18]. One of the participants told, every retrospective is not about the blame but rather the change in our thinking and perspective of work.

Although all seven TaRK factors have been confirmed as valid, issues with the proportionate participation in retrospectives, inconsistent documentation and constraints in time with the reflection discussions showed that the implementation of the factors should be facilitated constantly and with discipline by the team. Overall, the analysis revealed that clarity, collaboration, and continuous reflection are essential conditions for effective task-related knowledge sharing in distributed teams, which informs the derived guidelines and their relationship to these

influencing factors, discussed in the following subsection.

4.2. Derived Guidelines and Their Relationship to Influencing Factors

Eight industrially validated guidelines were obtained using thematic synthesis. These principles transform the TaRK factors into practical practices that strengthen knowledge sharing around work. These guidelines were developed out of common themes in the three case studies that were founded on practitioners trying to apply theoretical principles to their settings and adjusting to them intuitively. Although most guidelines were not particularly difficult, others, like keeping discussion forums and filtering of relevance, were known to require more coordination work, particularly in smaller groups or with teams that did not use formal KS tools. However, the participants were of the opinion that the advantages in terms of reluctance, cooperation and education were more than the problems of implementation.

Table 3 Relationship of Guidelines with IFs - KSAVT Framework

Guidelines	Supported TaRK Factors	Purpose
1. Importance of Task	TaRK 1, TaRK 3	Emphasize task significance to ensure clarity and commitment.
2. Task sharing (high workloads)	TaRK 2, TaRK 3	Encourage equitable workload distribution and mutual support.
3. Welcome Questions	TaRK 1, TaRK 2	Promote clarity through open communication and inquiry.
4. Welcome differing opinions	TaRK 3, TaRK 6	Improve decision-making through diverse perspectives.
5. Discussion forums about every task	TaRK 2, TaRK 4	Provide structured spaces for collaboration and solution exchange.
6. Welcome Ideas from others	TaRK 4, TaRK 6, TaRK 7	Foster creativity and innovation in problem-solving.
7. Iterations based on related tasks	TaRK 5, TaRK 7	Support continuous improvement and adaptive learning.
8. Share only relevant task-related knowledge	TaRK 1, TaRK 3	Ensure efficiency by filtering redundant or unrelated information.

The guidelines in combination operationalize knowledge sharing at the task level by combining selective knowledge curation, collaborative dialogue, and constant iteration into agile processes. An example, discussion forums should be maintained (Guideline 5) to improve the reuse of prior knowledge (TaRK 4), and the relevant sharing should be encouraged (Guideline 8) to reduce misunderstanding, information overload, and focus loss (TaRK 1 and 3).

The participants also identified that some of the guidelines, especially the ones that promote open communication and sharing of ideas, need a psychologically safe environment, which is not available to all distributed teams. Therefore, the support of leadership and trust-building activities were found as the required preconditions to apply them on a long-term basis. Building on the derived guidelines and their connection to the influencing factors, the integrative findings, discussed below, synthesize these insights to provide a comprehensive understanding of task-related knowledge sharing in distributed agile teams.

4.3. Integrative Findings

Cross-case analysis revealed the following three overarching insights.

- Task Awareness Builds Collective Ownership:

In the meetings that regularly took place, the emphasis on the significance of work and the allocation of tasks unanimously led to the development of mutual responsibility and alleviation of siloed conduct. This result is consistent with the previous studies, which posit that the open task structuring will boost commitment and cross-functional interaction [19].

- Open Communication Enables Learning:

Climates which were open to inquiries, deviant opinions and innovative propositions were more adaptable and creative. This transparency also strengthened the decision-making process and trust [20]. Such observations are reminiscent of Moe et al. (2016) [4] and Razzak et al. (2015) [3], who also outlined a communication openness as a basis of continuous learning in agile scenarios, and this study builds upon the evidence provided by referencing it to the practices associated with tasks.

- Iteration Sustains Knowledge Growth:

The collaboration through iteration through refinement of tasks through feedback and retrospective learning turned the project activities into an endless knowledge building cycle [21]. This is also supported by Ahsan (2025) [21], who highlighted the importance of reflection in the

development of a learning culture, and our results support how iteration implements this process in AVTs.

Overall, the findings suggest that the TaRK factors and guidelines work in concert and make knowledge sharing more goal-oriented, inclusive, and sustainable. It is through coordinating the structure of tasks, communication and reflection that AVTs can transform the daily tasks implementation process into an ongoing learning and knowledge-valuing process [22]. Comparing the findings to the known KS frameworks, this paper demonstrates that attending to the task level provides an additional explanatory layer to the known models, and provides a more detailed insight into how the knowledge flows can be transformed into team performance and agility.

Having presented and validated the empirical findings, the subsequent section discusses their theoretical and practical implications. It interprets how the validated TaRK IFs and derived guidelines contribute to the KSAVT Framework and inform effective collaboration within distributed agile teams.

5. DISCUSSION AND IMPLICATIONS

The current research paper refers to Task-Related Knowledge (TaRK) as the substantive core of knowledge sharing (KS) in Agile Virtual Teams (AVTs), which gives a connection between the daily performance of tasks and the team learning and long-term team performance. Unlike infrastructural or processual enablers that provide only structural support, task related practices have a direct impact on the interpretation, use and development of knowledge in agile operations. The fact that the seven TaRK-influencing factors were validated proves that clarity, collaboration, and reflection are unconditional conditions to be a successful KS in distributed agile environments. Redundancy and miscomprehension are prevented by explicit understanding of requirements (TaRK 1) and proactive sharing of experience (TaRK 2). Adaptability is based on shared responsibility (TaRK 3), autonomy (TaRK 5), and decision support (TaRK 6) and enduring learning (TaRK 7). All of these combined make the individual experience collaborative, and it proves that successful KS develops when both cognitive and social aspects are developed concurrently.

Nevertheless, the validation process also demonstrated contextual differences: certain teams needed more intensive facilitation in order to maintain reflective practices, and cultural

predispositions to the hierarchical communication sometimes constrained the openness in the retrospectives. Those observations indicate that the TaRK factors are universal though their application depends on the organizational culture and the maturity of the team.

Having presented and validated the empirical findings, the subsequent subsections discuss their practical and theoretical implications. It interprets how the validated TaRK factors and derived guidelines contribute to KSAVT Framework and inform effective collaboration within distributed agile teams

5.1. Practical Implications of TaRK Factors and Guidelines

The eight empirically based guidelines provide a tangible method of operationalization of the identified factors. They also offer practitioners practical strategies that can be applied to instill KS into the daily agile rhythm of work such that collaboration and learning are a process rather than an occurrence. Enabling the development of a psychologically safe environment (Guideline 3) through the facilitation of open discussions, accommodating divergent viewpoints (Guideline 4), and stimulating the exchange of ideas (Guideline 6) facilitates participants in interrogating, refining, and co-producing solutions. At the same time, the biased focus on task-relevant knowledge (Guideline 8) is protecting efficiency and reducing information overload, which is a widespread issue in distributed collaborations. Promoting a psychologically safe atmosphere (Guideline 3) by having open discussions (Guideline 4), encouraging the exchange of differing viewpoints (Guideline 4), and arousing idea generation (Guideline 6) assists the participants to question and clarify solutions to each other. Guided by task-relevant knowledge (Guideline 8), information overload can be avoided and productivity can be increased, which is one of the most systemic problems of distributed collaboration.

However, possible difficulties in implementation are also presented in the study. As an example, keeping discussion forums alive and relevance filtering takes extra coordination and success is strongly based on the aspect of trust and leadership support. Groups with weak facilitation or digital support tooling indicated that they did not find it easy to maintain such practices, which implies that the usefulness of the guidelines is dependent on the level of maturity of communication infrastructures as well as interpersonal trust among AVTs. Building

on these practical implications, the study also offers significant theoretical contributions, which are presented in the following subsection, that advance our understanding of knowledge sharing in distributed agile teams.

5.2. Theoretical Contributions

Theoretically, this study elaborates the Knowledge Sharing for Agile Virtual Teams (KSAVT) Framework by showing its empirical validation of the task-related dimension that knowledge sharing in agile contexts is not an incidental result of communication technologies or organizational procedures but a cognitively and socially entrenched task activity. The combination of seven driving forces and eight practical guidelines adds a micro-level theoretical framework explaining how and why knowledge exchange in the form of tasks can make teams more agile and increase the level of collective intelligence.

This research contributes to the current body of knowledge on the topic of distributed agile teams by;

- Creating a proven connection between task processes and knowledge outcomes.
- Aiding how reflective practices of tasks can transform individual learning into common knowledge.
- Giving a foundation to help guide academic research as well as the use in the industry.

Thus, the research contributes to the theoretical background of KS in distributed agile settings by illustrating that successful knowledge sharing stems not just in systems and tools but also in the perception of tasks, their sharing, and their overall performance.

While the study offers valuable theoretical and practical insights, it is also important to acknowledge certain limitations that define the scope of these findings and inform avenues for future research. The following section outlines these limitations, as well as potential directions for extending this work in the future.

6. LIMITATIONS AND FUTURE WORK

This study was restricted to a small sample of organizations and participants and thus this limited the generalizability of the results. Although the qualitative insights can provide a sound contextual interpretation of the knowledge sharing in terms of tasks, they mostly capture the experiences of adult software firms having well-established agile practices. Consequently, there will be

dissimilarities in the behavior of teams in the initial phase of agile implementation or those not in the software field when it comes to task related sharing knowledge.

The use of self-reported information by way of interviews was also subject to interpretation bias because the respondent might have given idealized information about their collaborative behavior. Moreover, triangulation involved the use of numerous sources of data, but observational evidence was not present in abundance, a fact that restricts the capacity to embrace unspoken dynamics or informal interactions that define knowledge flow.

These constraints imply that the validated TaRK factors and guidelines may be a sound tool in the context of their study, but the extent of their application should be taken into consideration. This should be interpreted as an initial but a preliminary finding that the results are grounded in nature and offensive in terms of future empirical research and testing as opposed to absolute laws.

Future studies can thus aim at conducting either quantitative or mixed method studies to quantify the effect of the eight guidelines on performance factors like productivity, the quality of collaboration, and learning outcomes. Such researches would allow statistical confirmation and explain the quality of causal associations between variables. Moreover, longitudinal studies might also be used to determine the effects of the ongoing introduction of these guidelines on the adaptability, flexibility, and retention of knowledge in a team over several agile cycles.

Lastly, it will be desirable to take the study further to investigate cross-category interactions, including the interaction between task-related knowledge and process, goal, or team-related dimensions, to get a more comprehensive idea of how these areas interrelate within the integrated KSAVT Framework. The analysis of such interdependencies may help to identify how the enhancement in the sphere of one dimension leads to the knowledge exchange and performance in the other one, which will provide a more holistic picture of the agile collaboration.

Having discussed the limitations and the future research directions, the following section concludes the paper by summarizing the key findings, theoretical contributions, and practical implications of this work within the broader field of knowledge sharing in agile virtual teams.

7. CONCLUSION:

The paper has explored the dimension of Task-Related Knowledge (TaRK) of a proven Knowledge-Sharing (KS) Framework of Agile Virtual Teams (AVTs) in terms of coordinating, sharing, and utilizing knowledge in performing distributed tasks. The results affirm the fact that good sharing of knowledge about tasks is imperative to goal-alignment, clarity, and continuous learning in agile environments dispersed globally.

The validation of seven influencing factors proves that the task-level teamwork is a direct contributor to a successful project since it promotes common ground, shared responsibility, and learning. The paper also established eight practical guidelines, which operationalize these factors, facilitate open discussions, workload sharing, exchange of ideas, iteration and filtering of relevance. All these guidelines make knowledge sharing a meaning that involves not a passive exchange of knowledge, but a more active and entrenched part of performing agile work.

The findings highlight that task-specific KS is a mediator of individual knowledge and team intelligence. Once such teams have created clarity, autonomy, and trust with a well-organized communication, they transform the daily routine of executing tasks to a learning system that is sustainable.

In addition to its empirical inputs, the study extends the conceptual knowledge sharing in agile distributed environment because it sets task-related practices as the key tool in the process of connecting agility, learning, and performance. It offers researchers and practitioners a validated, task-focused prism with the help of which the micro-dynamics of collaboration may be effectively analyzed and refined. The combination of theoretical and practical applicability will form the basis of future frameworks and methodologies that will further narrow the knowledge theory-agile teamwork gap in digital age.

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