

## Synchronizing Across the Globe: Adaptive Time-Coordination Tactics for Virtual Agile IT Teams

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### ABSTRACTS

As globally distributed virtual IT teams become the norm, organisations increasingly rely on Agile practices whose emphasis on face-to-face communication clashes with extreme time-zone dispersion. This conflict creates significant management challenges, including disrupted communication, slowed feedback cycles, and difficulty maintaining project rhythm. This paper aims to identify and analyse the adaptive time-coordination tactics that such teams use to overcome temporal distance. Employing a qualitative, phenomenological approach, data collection was conducted through semi-structured interviews with practitioners from teams (n=7) spanning a 7- to 15-hour time zone difference. An inductive thematic analysis by systematically coding the transcripts then revealed core strategies derived directly from the participants' narrative accounts. Key findings indicate that effective teams do not force full-day synchronization but instead strategically leverage a limited synchronous 'overlap window' for high-bandwidth collaboration. Complementing this, teams implement a disciplined 'asynchronous handoff' to create a continuous, 24-hour workflow, transforming temporal separation into a strategic advantage. Agile ceremonies are pragmatically reconfigured to conserve synchronous time: daily stand-ups are often replaced or supplemented with asynchronous updates, and heightened individual autonomy, expressed through proactive task-switching, maintains momentum and productivity. The study concludes that success in virtual Agile environments hinges on a flexible, context-aware repertoire of emergent tactics rather than rigid adherence to traditional Agile practices. These insights offer managers a practical template for structuring globally distributed Agile work, enhancing temporal efficiency and coordination while preserving the iterative spirit of Agile development.

Manuscript received Jun 09, 2025;  
revised Jun 13, 2025. accepted Jun  
14, 2025 Date of publication Jun  
30, 2025. International Journal,  
JITSI : Jurnal Ilmiah Teknologi  
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**Keywords / Kata Kunci** —*Agile; virtual teams; time management; temporal coordination; asynchronous work*

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### 1. INTRODUCTION

The global shift toward remote work, propelled by widespread digital transformation and the COVID-19 pandemic, has established remote work as a lasting fixture in the information technology (IT) industry. The IT sector has emerged as a leader in adopting remote work, highlighting the dominance of the virtual team as a standard operational model [1]. These teams, with members collaborating across significant geographical and temporal distances, rely on digital communication technologies to function [2], [3]. In parallel, Agile methodologies have become the predominant approach to managing IT projects due to their capacity for fostering

flexibility, iterative development, and rapid adaptation in complex environments [4]. This convergence creates a fundamental operational paradox. The Agile Manifesto explicitly prioritizes face-to-face conversation as the most efficient and effective method of conveying information; a principle originally conceived for co-located teams [5].

An extensive body of literature documents the challenges of this paradigm clash. The shift to virtual work complicates core Agile practices, impacting team cohesion, collaboration, and communication [6]. Communication deficiencies are frequently cited as a critical challenge in distributed Agile environments, where the absence of non-verbal cues and immediate feedback increases the risk of misunderstandings [7], [8]. Furthermore, the virtual setting leads to a loss of spontaneous knowledge exchange and organic interactions, which are vital for the informal learning and rapid problem-solving cycles inherent in Agile [9], [10]. The temporal distance created by differing time zones stands out as a primary impediment, directly disrupting the cadence of core Agile ceremonies like daily stand-ups and sprint planning [11], [12], [13]. However, previous research often focuses broadly on work-from-home or distributed teams across various industries. This work effectively maps the problems but often stops short of detailing the granular, practitioner-developed tactics used within the unique context of virtual IT teams to specifically overcome temporal barriers. A distinct research gap exists in the deep, qualitative understanding of these emergent and adaptive time-coordination solutions.

Addressing this research gap is an operational imperative for the modern IT organization. As remote work transitions from a temporary measure to a permanent strategic choice, organizations require practical, empirically grounded guidance that moves beyond problem identification toward tactical implementation. Understanding the successful, lived strategies of high-functioning virtual teams provides an invaluable blueprint for others seeking to optimize their own distributed operations [14]. This study provides this focused analysis, exploring the nuanced ways teams creatively manage their schedules, structure their workflows, and synchronize their efforts across the globe.

Therefore, the purpose of this article is twofold. First, we aim to identify and systematically analyze the adaptive time-coordination tactics that virtual Agile IT teams employ to overcome the challenges posed by temporal distance. Second, based on this empirical analysis of practitioner-led solutions, we formulate a set of actionable recommendations to assist project managers and organizations in enhancing the temporal efficiency, coordination, and overall success of their virtual Agile projects

## 2. RESEARCH METHODOLOGY

A qualitative research strategy was employed to achieve the research objectives, as this approach is uniquely suited for exploring complex, dynamic, and context-dependent social phenomena [15]. A qualitative methodology was preferred for this study because its primary aim was to explore the nuanced, practitioner-developed strategies and their underlying logic, rather than quantifying occurrences or testing pre-existing hypotheses. This approach allows for an in-depth exploration of the "how" and "why" behind team behaviors, an understanding that would be lost in statistical analysis. Given that the adaptation of Agile principles to fully virtual environments is an emergent field, a qualitative approach provides the necessary flexibility to explore unexpected insights and build rich, descriptive theories grounded in real-world practice. Specifically, a phenomenological design was adopted to focus on capturing the essence of the lived experiences and perceptions of individuals navigating the challenges of time coordination within virtual Agile projects [16]. In the analysis of this data, the researchers relied on the participants' views as an insider emic perspective, aiming to faithfully represent their unique understanding, terminology, and lived experiences of managing temporal challenges [16].

### 2.1. Participant Selection

Participants were recruited using a combination of purposive and snowball sampling techniques to identify individuals with direct, relevant experience in the phenomenon under study [17]. The selection criteria required that individuals held an active role in an Agile IT project, worked within a fully virtual team, and had at least three months of experience in this setting. This process yielded a sample of seven practitioners from various organizations, ranging from early-stage startups to large technology corporations. The participant roles were diverse and included software engineers, a design engineer, a research engineer, and founders who also served as Chief Technology Officers (CTOs).

The participant pool was characterized by significant temporal dispersion, which was a deliberate component of the selection strategy. As detailed in Table 1, the teams operated across multiple continents, resulting in maximum time zone differences ranging from a moderate 6 hours to an extreme 15 hours. This wide range ensured the data would capture a broad spectrum of temporal challenges, from managing partial workday overlaps to coordinating projects with virtually no synchronous hours in a standard workday. Crucially, many participants (five out of seven) belonged to teams with a maximum temporal separation of 12 hours or more. This distribution provided a robust empirical foundation for analyzing the adaptive tactics employed in the most demanding time-coordination scenarios, which is central to the focus of this research.

**TABLE 1.** Participant demographics and temporal dispersion

Participant	Role	Team Size	Geographic Spread	Max. Time Zone Difference
A	Founder & CTO	3	USA, Indonesia	15
B	Founder, Software Engineer	10-15	USA, Canada, India, China, Philippines	15
C	Software Engineer	7	Indonesia, Germany, India, Ukraine, USA	13
D	Research Engineer	6	Switzerland, UK, Canada	7
E	Software Engineer	10	USA, UK	8
F	Design Engineer	3	USA, Indonesia	14
G	Software Engineer	7-8	USA, Netherlands	9

The sample size of seven participants is appropriate for this phenomenological study, as the objective was to achieve descriptive depth and interpretive understanding rather than statistical generalization. The purposive sampling strategy ensured that each participant was an information-rich case capable of providing significant insight into the research topic. The study reached theoretical saturation, a point where the collection of new data did not yield new conceptual insights or themes [16]. During the analysis, the research team observed that the core adaptive tactics, such as the strategic use of overlap windows and asynchronous handoffs, consistently recurred in the narratives of the later interviews, confirming that the data was sufficiently comprehensive to address the research questions.

## 2.2. Data Collection

The primary method for data collection consisted of in-depth, semi-structured interviews conducted individually with each participant. This format was selected to allow for a flexible yet focused inquiry into their personal experiences. The interview protocol was designed with open-ended questions that prompted participants to provide rich, narrative accounts of their day-to-day work, focused on time management, coordination challenges, and adaptive strategies. The semi-structured nature allowed the researcher to dynamically ask follow-up questions to probe deeper into emergent topics and clarify the context behind specific strategies [18]. All interviews were conducted via the Zoom video conferencing platform. To foster a comfortable and authentic dialogue, participants were given the liberty to respond in their preferred language. Each session was audio-recorded with the participant's consent and later transcribed verbatim. This process ensured that the full nuance, tone, and detail of the participants' narratives were preserved for a thorough analysis.

## 2.3. Data Analysis

The analysis adopted a bottom-up, inductive approach, meaning that themes and insights were derived directly from the participant data rather than being guided by a pre-existing theoretical framework. This research employed a thematic analysis, which was executed using the interactive model of data condensation, data display, and conclusion drawing [19]. The analysis commenced with a process of open coding, during which the research team conducted a line-by-line review of the interview transcripts. The team applied descriptive codes to discrete segments of data that captured specific actions, challenges, or perceptions, generating initial labels such as "waiting for colleague to wake up," "scheduling meetings at dawn," and "using Slack for daily updates."

In a second cycle, the researchers used an axial coding technique to group these initial codes into more conceptual categories. For instance, codes related to scheduling compromises and the strategic use of meeting times were consolidated into the category "Management of Synchronous Windows." Similarly, codes related to proactive documentation and passing tasks to colleagues in other time zones formed the category "Asynchronous Workflow Continuation." This systematic process of comparing and clustering codes across all interviews allowed the researchers to move from descriptive observations to a higher level of abstraction, identifying the core patterns and relationships that formed the basis of the final themes. The final stage involved interpreting these emergent themes to construct the coherent framework of adaptive time-coordination tactics presented in this article.

## 3. RESULTS AND DISCUSSION

The research findings reveal a set of sophisticated, practitioner-developed tactics that virtual Agile teams employ to navigate and master the complexities of temporal distance. The primary challenge identified by all participants was the inherent friction caused by significant time zone differences, which disrupts synchronous communication, slows feedback cycles, and creates potential for project momentum to stall. However, rather than viewing this temporal gap as an insurmountable obstacle, successful teams reframe it as a constraint to be managed through deliberate, adaptive strategies. This section presents and discusses these key tactics, which revolve around

the strategic management of synchronous and asynchronous work periods, the adaptation of individual behaviors, and the reconfiguration of core Agile ceremonies supported by direct participant accounts.

### 3.1. Leveraging the Overlap Window for High-Bandwidth Collaboration

A core finding of this study is that effective virtual teams do not attempt to force full-day synchronization. Instead, they identify and strategically leverage a limited period of synchronous overlap in their workdays. This "overlap window" becomes a highly valued, finite resource dedicated exclusively to high-bandwidth collaborative activities that are inefficient or impossible to conduct asynchronously, such as resolving complex technical bugs or holding critical decision-making meetings. The significance of this window was articulated by one participant (A), who noted the direct impact of missing it, explaining, "Once you're past that overlapping time window, then you have to wait sometimes 10, 12 hours to get feedback. That's the second issue. And then you lose velocity because of it."

Achieving this overlap often requires significant personal compromise from team members. One engineer (G) described the negotiation involved, stating, "We just, like, discuss what time is good for you, what time is good for us. So, the compromise that we can find is early morning in the States and the kind of late evening for Europeans." Another participant (F) shared a specific example of this adjustment, recounting how a recurring meeting was moved from her 4:00 AM to a more manageable 8:00 AM, which required her US-based lead to take the meeting in his late afternoon.

This approach represents a pragmatic adaptation of the Agile Manifesto's prioritization of face-to-face conversation [5]. Unable to achieve constant co-presence, teams distill the purpose of direct interaction, which includes rapid feedback, shared context building, and complex problem-solving, and concentrate it into the only time available. This finding supports previous research highlighting the importance of temporal synchronization [20] but adds a crucial layer of nuance. It demonstrates that it is the quality and focus of the synchronous time, not the sheer quantity, that determines its effectiveness in a virtual setting.

The challenge of establishing this window is vividly demonstrated by a globally distributed team spanning Indonesia, Europe, and the USA. Fig. 1 visualizes the working hours across these disparate time zones, illustrating that a functional overlap is only achieved through significant personal adjustments. The diagram shows that to create a synchronous window, members in Indonesia must work into their evening, while the CEO in the US starts meetings at dawn. This visual evidence directly supports the account of a participant (C) from this team, who stated, "There has to be a compromise. Like, some have to wake up early... For the CEO, his meeting is at dawn. So, he is the one who sacrifices." This collective commitment to protecting and utilizing the overlap window underscores that its success is contingent not only on scheduling mechanics but also on the team's shared understanding and flexibility.

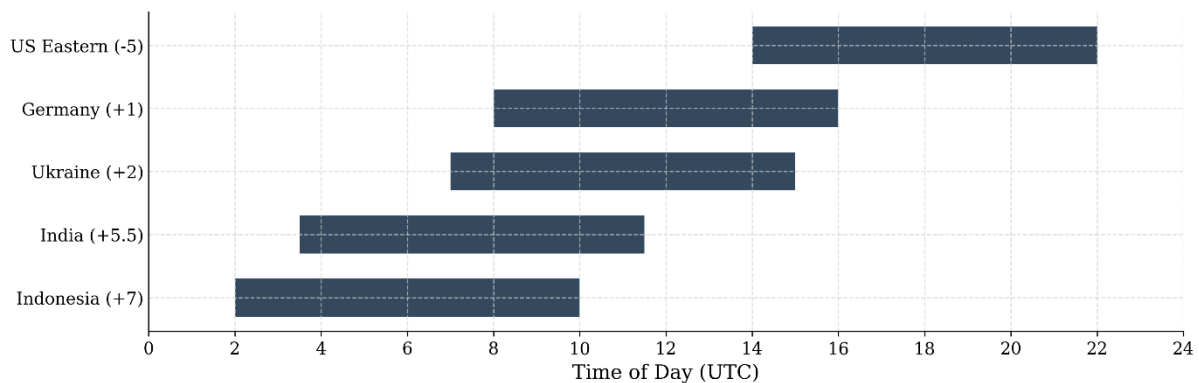


FIG 1. Working Hour Visualization for Participant C Team

### 3.2. The Asynchronous Handoff for Continuous Workflow

Complementing the strategic use of synchronous time is the deliberate optimization of asynchronous work periods. This study found that high-performing teams actively structure their workflows to create an "asynchronous handoff," effectively turning the time zone difference into a driver of continuous, around-the-clock progress. This tactic was described in detail by a participant (F), who explained, "So like typically in the evening, if I want my colleague to look at something, I have to finish it before I go to bed and send it to them and then when they wake up, they can look at it and then when I wake up, I get the reply back from them. So, you kind of have to structure the work in this way so that the time is not wasted." This strategy requires disciplined communication. One engineer (P7) described this discipline: "So you have to think very carefully and format a nice email... and expect that they're going to give you one detailed response back."

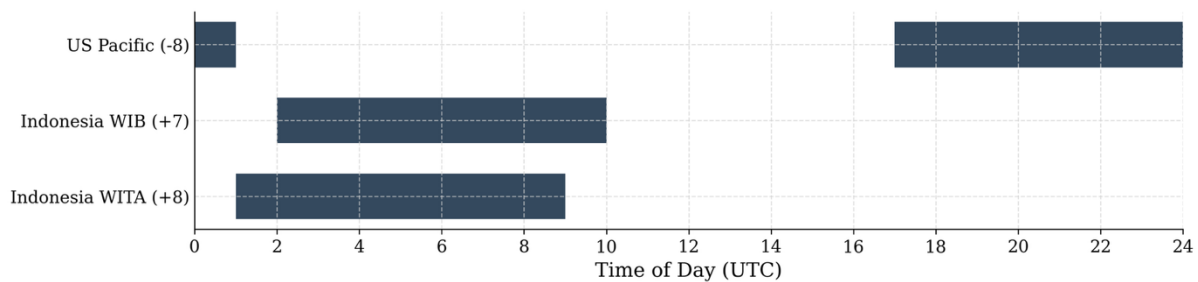
This strategy serves as a direct and powerful countermeasure to the communication delays and productivity loss frequently identified as major barriers in virtual teams [2]. By structuring work in this cyclical manner, teams minimize the idle time that occurs while waiting for responses across time zones. This proactive workflow design requires a high degree of process clarity, excellent documentation, and trust that the receiving team member will act on the handoff. When executed effectively, this tactic transforms the temporal gap from a liability into a strategic asset, enabling a 24-hour development cycle that can accelerate project velocity.

A specific tactic involves using detailed documentation to prevent communication bottlenecks. A design engineer (F) explained how she began providing extensive annotations on her design prototypes, a practice that significantly reduced inefficient back-and-forth messaging. She noted that after implementing this, her engineering counterpart "can finish the work well, exactly as I wanted... he doesn't need to chat while working." This proactive workflow design, requiring process clarity and excellent documentation, serves as a direct countermeasure to the communication delays frequently identified as barriers in virtual teams [20].

### 3.3. Behavioral and Structural Adaptations for Temporal Resilience

Beyond team-level processes, the research identified crucial adaptations at both the individual and structural levels. At the individual level, a key behavior is proactive task switching. When confronted with a blocker that requires input from an offline colleague, team members pivot to other available tasks in the backlog. As one engineer (C) stated, "I won't wait. I'll take another task... it's a waste of time if you wait for that person to wake up," a sentiment echoed by another engineer (P7), who explained, "if you're blocked on something, you can still work on something else. So, you just work on something else while you're waiting." This self-directed behavior is essential for maintaining personal productivity and highlights the necessity of having high-agency individuals who can manage their own workstreams autonomously.

At the organizational level, teams implement structural tactics to build temporal resilience. A significant strategy is the deliberate distribution of system privileges and knowledge. This strategy is particularly critical for teams facing extreme temporal dispersion. Fig. 2 illustrates such a scenario, depicting the working hours for a team split between Indonesia and the USA Pacific time zone. The visualization starkly reveals a complete lack of overlapping standard work hours, creating up to a 15-hour time difference that effectively separates the team's workdays. By ensuring key personnel in each major time zone have the access and expertise to resolve critical issues, teams can mitigate the risk of system-wide failures that would otherwise be stalled by this temporal gap. One founder (A) described how this transformed their operations, noting, "...it even turned into an advantage, because of the time zone difference, we now have almost a 24-hour coverage... and we had situations, where something happened in the middle of the night... and we could still restart a server... because somebody else could take care of it." For some, however, the most effective structural adaptation is avoidance. Another founder (B) revealed that their startup made a conscious decision to restrict hiring to a narrow band of time zones, concluding that the overhead of complex temporal coordination was a competitive disadvantage.



**FIG 2.** Working Hour Visualization for Participant A Team

### 3.4. Reconfiguring Agile Ceremonies for Virtual Teams

The research clearly demonstrates that virtual teams do not rigidly adhere to the standard cadence of Agile ceremonies. Instead, they pragmatically reconfigure them to fit the constraints of their virtual environment, a finding that supports the concept of methodology tailoring [21]. The daily stand-up is the most radically adapted ceremony. Many teams replace the synchronous meeting entirely with a written update, a practice one participant (D) termed an "asynchronous stand-up via Slack message." Another team (G) reduced the frequency of their stand-ups to three times a week and made the Friday session asynchronous, a change he noted was "very helpful, as it allows me to have a full block of focused time."

The sprint retrospective, a cornerstone of Agile's "inspect and adapt" cycle, was found to be the ceremony most likely to be sacrificed. Teams often perceive it as less critical for immediate operational progress and will conduct it informally, less frequently, or eliminate it to conserve precious synchronous time. One participant (C) provided a blunt rationale for its removal, stating, "We used to have it [retrospectives], now we don't... In my opinion, the

sprint and retro were created because we had non-performers. Now we don't need it because it's a waste of time... an hour multiplied by six engineers is very expensive." This finding suggests a significant trade-off in virtual Agile practice. While adapting ceremonies for efficiency is a logical response to temporal constraints, the de-prioritization of a core reflective practice like the retrospective may introduce long-term risks. It suggests a potential erosion of the continuous process improvement cycle in favor of maximizing short-term delivery efficiency, a critical tension for managers of virtual teams to monitor and address.

#### 4. CONCLUSIONS

This research concludes that the optimal application of Agile methodologies in virtual IT teams hinges not on rigid adherence to traditional practices, but on a flexible framework of adaptive tactics designed to overcome temporal distance. The study identified that successful teams strategically manage time by protecting a limited synchronous 'overlap window' for complex collaboration while using an 'asynchronous handoff' to enable continuous, 24-hour workflow. These process adaptations are supported by a culture of high individual autonomy and the structural distribution of system knowledge across time zones. Critically, teams reconfigure core Agile ceremonies, frequently replacing daily stand-ups with asynchronous updates and de-prioritizing formal retrospectives in favor of immediate, focused problem-solving. These findings collectively demonstrate that optimality is achieved through a dynamic, context-aware integration of strategies, not a single prescribed method.

The practical application of these findings translates into a set of direct recommendations for project managers seeking to improve temporal efficiency. First, managers should formally identify and protect the team's 'core overlap window' by establishing clear policies that reserve this period exclusively for high-interaction tasks. Second, organizations must implement a standardized 'asynchronous handoff' protocol, such as a dedicated communication channel or template that requires team members to detail completed work, task status, and specific actions needed from colleagues in the next time zone. Third, to mitigate the risks associated with skipped retrospectives, managers should introduce lightweight, asynchronous feedback mechanisms, like a permanent digital board for process improvement suggestions that can be reviewed briefly during synchronous meetings. Finally, to foster the proactive task switching observed in high-performing individuals, managers must ensure the project backlog is always well-groomed with multiple, clearly defined tasks that team members can undertake autonomously when faced with a blocker.

The study's findings suggest the emergence of a distinct 'virtual Agile' framework, where traditional principles are reinterpreted for a temporally distributed context. Future research should build upon these qualitative insights. A large-scale quantitative study could measure the correlation between the adoption of these specific tactics and key performance indicators like project velocity and team satisfaction. Furthermore, longitudinal research is needed to track how these strategies evolve as virtual teams mature and as collaboration technologies advance. Such work is essential for validating and formalizing a robust set of best practices for the modern virtual workplace.

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