

End-to-End Planning as a Tool for Synchronizing Participants in a Large Project

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Abstract: This study examines through planning (also referred to as end-to-end planning) as a structural mechanism for achieving systematic coordination among multiple participants in large and complex projects. Despite decades of methodological advancement in project management, the failure rate of large-scale initiatives remains persistently high: only 35% of projects worldwide meet all goals and timelines according to PMI (2025), and 78% of large projects experience schedule overruns. The research applies a systematic literature review combined with comparative case analysis to identify coordination failure patterns and evaluate how through planning resolves them by integrating Integrated Master Schedules, Program Increment Planning, cross-functional cadence systems, and project resource coordination into a single cohesive framework. Drawing on cases from the technology, infrastructure, and public sectors, the study proposes the Synchronized End-to-End Planning Architecture (SEPA), a five-layer operational framework mapping strategic objectives to team-level execution. The findings confirm the hypothesis that through planning, when implemented as a deliberate coordination architecture rather than a scheduling exercise, significantly reduces misalignment between project participants across all lifecycle phases. Project managers, PMOs, functional leads, and senior leadership in organizations managing distributed multi-team initiatives will find the framework practically applicable.

Keywords: Through planning, End-to-End planning, Project synchronization, Integrated master schedule, Stakeholder coordination, Large-scale project management, Cross-functional team alignment, Project resource coordination, Program increment Planning, Project coordination architecture.

Introduction

Project complexity has grown substantially over the past decade. The Project Management Institute (PMI) Pulse of the Profession 2025 report, based on responses from more than 3000 project professionals globally, found that only 35% of projects finish successfully on time, on budget, and within scope [1]. Among large initiatives specifically, the numbers are considerably worse: McKinsey analysis of more than 300 projects with contract values exceeding \$1 billion found average cost overruns of roughly 80% and schedule delays approaching 50% [2].

The root cause of these outcomes is not technical complexity per se. Research by PMI consistently identifies unclear goals, weak stakeholder engagement, and poor communication as the primary failure drivers [1]. In large projects, where teams from engineering, finance, operations, technical functions, and external

contractors must converge around a common execution plan, this coordination deficit is not an exception. It is the norm.

Through planning (end-to-end planning, hereafter E2E planning) addresses this problem by treating the entire project lifecycle as a single interconnected planning object rather than a set of independent departmental schedules. The concept, institutionalized in the United States Department of Defense through the Integrated Master Plan and Integrated Master Schedule framework [4] and operationalized in scaled agile contexts through Program Increment Planning [5], provides a hierarchical mapping of strategic goals down to weekly team tasks, with bidirectional feedback loops ensuring that deviations at the execution level surface at the strategic level within defined time windows. What the academic literature has not yet systematically addressed is how E2E planning functions as a

coordination instrument specifically in the context of multi-participant large projects, and how it links schedule integration, project resource availability, role clarity, and cross-functional dependencies within a single coordination architecture.

The present study addresses this gap. The **research objective** is to analyze through planning as a participant synchronization mechanism in large projects, identify the structural elements that make it effective, and propose a practical operational framework combining schedule integration, cross-functional coordination, project resource planning, and execution control. The study draws on a systematic review of peer-reviewed literature, comparative case analysis of projects across multiple industries, and integration of the author's prior empirical work on project metrics adaptation and Kanban-based workflow coordination [6, 7].

Scientific novelty: this study introduces the Synchronized End-to-End Planning Architecture (SEPA), a five-layer framework that explicitly integrates project resource coordination and cross-functional workflow synchronization into the through planning cycle, positioning capacity and dependency alignment as structural preconditions for effective synchronization among project participants.

Author's hypothesis: through planning, when designed as an intentional multi-layer coordination architecture rather than a scheduling artifact, reduces cross-participant misalignment in large projects by providing shared situational awareness, structured escalation pathways, and explicit synchronization points across planning levels and project lifecycle phases.

Limitations of the study are primarily scope-related. The analysis focuses on large projects broadly defined as initiatives with more than 50 participants or a duration exceeding 18 months, which means findings may require adaptation for smaller or shorter initiatives where coordination overhead itself becomes a burden. The case evidence is drawn from secondary sources and published case studies rather than from primary fieldwork, which constrains the depth of within-case analysis. These limitations do not undermine the conceptual and practical value of the framework but point toward productive directions for future empirical research.

The study findings are relevant to project managers,

PMO directors, program managers, functional leads, and senior executives responsible for orchestrating multi-team delivery programs. For the United States, where the global demand for project professionals is projected to grow by 64% between 2025 and 2035 [1], the capacity to design coordination-effective project architectures represents not merely an organizational competency but an economic development asset. The connection between disciplined project management practice and national infrastructure delivery, technology development, and industrial competitiveness makes the study's focus directly relevant to practitioners responsible for complex cross-functional project coordination.

Materials and Methods

The research design combines three methodological approaches: a systematic literature review, comparative case analysis, and conceptual framework development. Each approach served a distinct function in building toward the SEPA framework.

A structured literature search was conducted across Scopus-indexed and Web of Science-indexed sources published between 2020 and 2025, supplemented by selected peer-reviewed conference proceedings from IEEE and Springer. Search queries combined the following term clusters: "through planning," "end-to-end planning," "integrated master schedule," "project synchronization," "cross-functional coordination," "stakeholder alignment," "program increment planning," "large project coordination," "project resource coordination," and "visual workflow management." Sources using the terms "blog," "press release," or "news" in their metadata or URL were excluded. Analytical reports from McKinsey and PMI were included as secondary-priority sources (under 10% of the total reference pool) given their methodological rigor and representative sample sizes. The final reference pool consists of 21 sources, of which 20 are peer-reviewed academic publications or institutional technical documents.

The classification of sources proceeded along three functional dimensions. The first dimension covers theoretical foundations: articles establishing coordination theory, boundary object theory applied to scheduling tools, and organizational design in megaprojects. The second dimension covers empirical evidence: studies reporting quantitative outcomes from

specific project types, including construction megaprojects, IT development programs, and infrastructure builds. The third dimension covers methodological frameworks: published guidance on IMS, PI Planning, EVM, and agile coordination mechanisms.

Five project cases were selected for comparative analysis based on availability of documented performance data and heterogeneity of industry context. Cases span the construction megaproject sector (Crossrail, UK), large IT platform migration in a Fortune 500 environment (2022), a US public infrastructure project (2023), a technology product launch using agile coordination (2024), and a European energy infrastructure project (2023 to 2024). Case selection followed a theoretical sampling logic: cases were chosen to represent variation in coordination approaches and outcomes, not to constitute a statistically representative sample. Each case was analyzed against four variables: planning approach deployed, schedule outcome vs. baseline, budget variance, and the primary synchronization mechanism that explained the performance result. Where quantitative data were available from published sources, they were used directly; where only qualitative characterizations were available, outcome categories were assigned using a structured coding rubric.

The SEPA framework was developed inductively from the literature review and case analysis, guided by two prior empirical works by the author: a study on

adapting project metric systems to lifecycle stages, which established the need for phase-sensitive measurement architectures [6], and a study demonstrating the applicability of Kanban-based visual workflow management as a coordination mechanism [7]. The framework underwent a structural validation pass in which each layer was checked against published coordination research (Zani et al., 2024 [8]; Berntzen et al., 2021 [5]; Hu et al., 2024 [9]) to confirm that the proposed components correspond to empirically documented coordination mechanisms rather than speculative constructs.

The five-level maturity model embedded within the SEPA framework follows the structure of established capability maturity approaches in project management (CMMI, OPM3), adapted to reflect the specific domain of through planning rather than general project management maturity. The maturity levels were calibrated against the coordination failure patterns identified in the literature and the case evidence, rather than being derived deductively from theory alone.

Results and Discussion

Before turning to through planning as a solution, it is worth establishing the scale and nature of the coordination problem it addresses. The numbers are not ambiguous. Figure 1 below presents key performance data drawn from PMI Pulse of the Profession 2025 and related industry sources, illustrating the gap between what organizations expect from large projects and what they actually deliver.

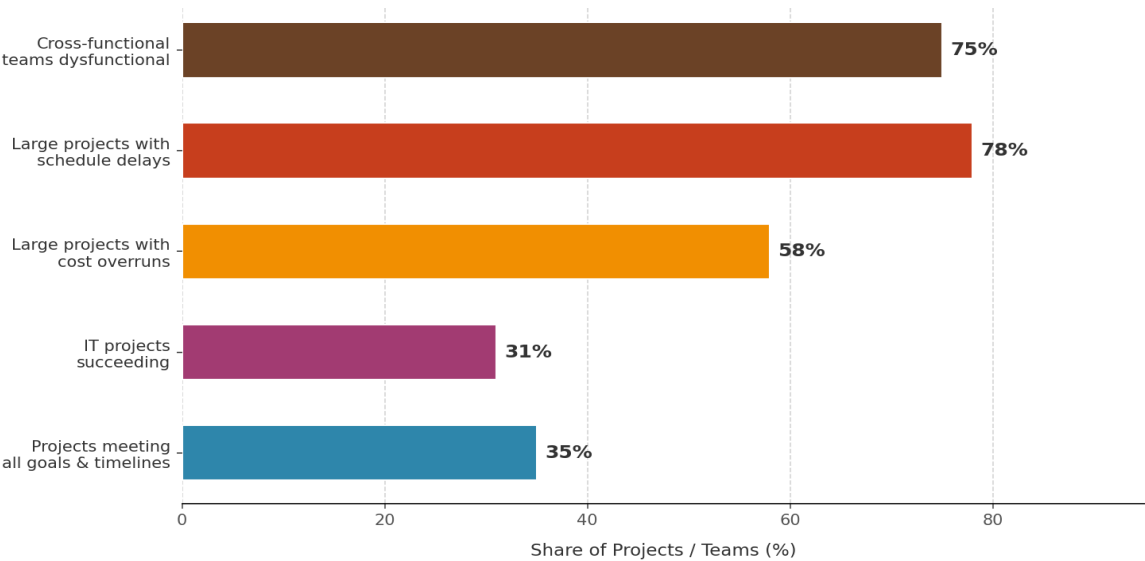


Figure 1. Project Management Performance Indicators: Major Coordination Challenges (2024-2025) (compiled by the authors based on [1, 3, 10]).

What Figure 1 makes visible is a cluster of structural problems that are not independent. Only 35% of projects worldwide finish on time, on budget, and within scope [1]. IT projects perform even worse, with about 31% reaching all three criteria [10]. Large projects, defined by size and participant count, experience cost overruns at a 58% rate and schedule delays at a 78% rate in public-sector studies [10]. Perhaps most revealing for the purposes of this study, 75% of cross-functional teams, which are the organizing unit of virtually every large project, are dysfunctional on standard performance criteria [3].

These are not random failures. Zani, Denicol, and Broyd (2024), in a systematic review of organizational design literature covering megaprojects such as Crossrail, Thames Tideway Tunnel, and High Speed Two, identified coordination as the central unresolved challenge: existing organizational design models fail to treat coordination as a deliberate design choice, instead treating it as an emergent property of structure [8]. The result is that most large projects start with a structural plan but without a coordination plan, which leaves participant synchronization to informal negotiation rather than designed interaction patterns.

Hu, Wu, and Zhang (2024), analyzing 361 megaproject teams using structural equation modeling, found that high network density is positively associated with project performance but that coordination is not the primary mediating variable. Instead, specialization and credibility, both of which depend on clearly defined roles and consistent information flow, are the dominant mediating effects [9]. This suggests that through planning contributes to performance not just by sequencing work but by creating the role clarity and information architecture that allow specialization to function.

Berntzen, Stray, and Moe (2021), studying a Norwegian public sector development program using large-scale agile coordination, proposed that dependency awareness is necessary but not sufficient for effective coordination, and that planning alignment across all phases is necessary but not efficient for dependency awareness [5]. The implication is that coordination requires both awareness and action, and that the planning artifacts through which awareness is generated must themselves be integrated.

Through planning, in the sense used in this study, is not simply end-to-end scheduling. It is a multi-layer coordination architecture that links strategic project objectives to operational task execution through a sequence of integrated planning instruments, each operating at a different time horizon and organizational level. The Department of Defense IMP/IMS framework (2023, updated 2024) provides the foundational definition: the Integrated Master Plan defines significant accomplishments at the event level, while the Integrated Master Schedule adds a fourth level of detailed task timelines, creating a four-level hierarchy from events to accomplishments to criteria to tasks [4].

This hierarchy is the key structural contribution of through planning. Without it, each organizational participant tends to plan within their own horizon and in their own tool, with no structural mechanism linking their outputs to others. When a construction contractor's three-week look-ahead schedule is not connected to the client's six-month milestone plan, which is not connected to the procurement team's 18-month contracting schedule, delays in one stream become invisible to others until they materialize as project-level crises. Through planning resolves this by requiring that all participant schedules are networked into a single reference structure.

Atlassian (2025) defines an Integrated Master Schedule as a comprehensive project management tool that consolidates all project activities, milestones, and deliverables into a single unified timeline, serving as a central repository for project information [11]. The key operational point is that the IMS is not a summary document. It is a networked schedule in which changes to any sub-schedule propagate through the network, making the downstream effects visible before they occur. This is what distinguishes through planning from project plans that exist in documents no one maintains after the kickoff meeting.

Drawing on the literature and case evidence, the present study proposes the Synchronized End-to-End Planning Architecture (SEPA) as an operational framework for implementing through planning in large multi-participant projects. The framework comprises five functional layers, each with defined tools, outputs, and interaction patterns with adjacent layers. Figure 2 presents the full architecture.

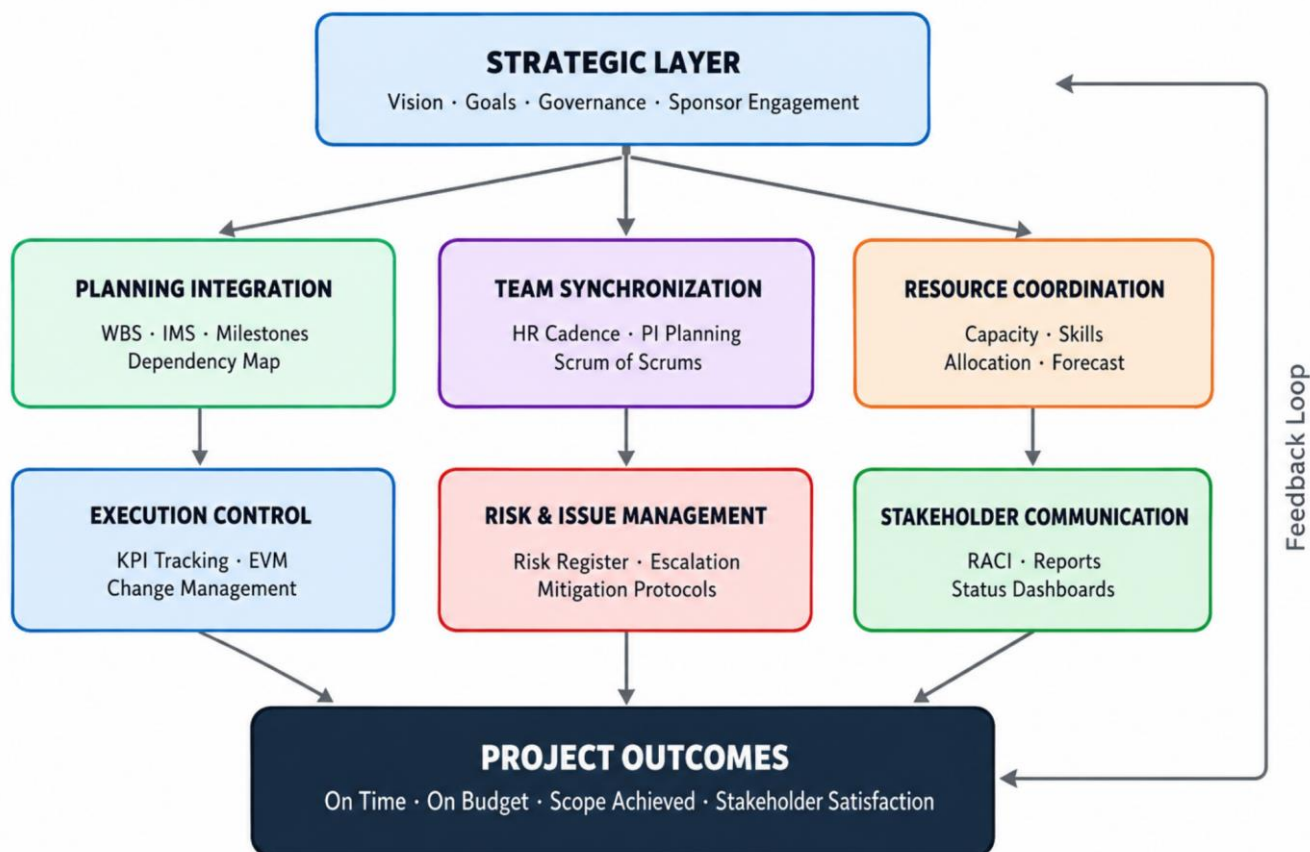


Figure 2. SEPA Framework: Synchronized End-to-End Planning Architecture (compiled by the authors based on [1, 4, 5, 8, 15, 16]).

The Strategic Layer at the top of SEPA translates sponsor vision and governance decisions into documented project objectives, success criteria, and stakeholder engagement protocols. This layer operates on a project lifetime horizon and is the source of authority for all decisions made in layers below it. Without an active strategic layer, which means a sponsor who can make binding decisions and communicate them clearly, coordination efforts at lower levels degrade into negotiation without resolution authority.

The Planning Integration layer translates strategic objectives into a structured Work Breakdown Structure and Integrated Master Schedule, mapping milestones, dependencies, and critical path elements across all participating organizations. Mastt (2025) notes that a well-structured IMS enables effective planning and real-time tracking of project milestones, allowing teams to make proactive adjustments before minor delays escalate into costly overruns [12]. The key deliverable of this layer is a published, maintained, and version-controlled IMS that is accessible to all project participants.

The Team Synchronization layer converts the IMS into team-level execution commitments through regular

planning events. In agile-aligned projects, this takes the form of Program Increment Planning, in which all teams commit to a set of objectives for an 8 to 12 week period and document dependencies on other teams [5]. In more traditional project environments, this layer is operationalized through milestone review meetings, look-ahead planning sessions, and interface management protocols. Regardless of methodology, the function is identical: to create a shared, explicit, time-bounded commitment from every team about what they will deliver and what they need from others.

The Resource Coordination layer aligns project capacity, skill coverage, role assignments, work-in-progress constraints, and dependency ownership with the Integrated Master Schedule. These variables are treated as project planning inputs because shortages or mismatches at the team level can directly affect milestone feasibility and downstream dependencies. The author's earlier research demonstrated the applicability of Kanban-based visual workflow management for making work states, constraints, and handoffs explicit [7]. SEPA extends this logic by treating resource capacity and workflow visibility as planning variables that must be synchronized with the IMS before execution begins rather than corrected only after

delivery gaps become visible.

The Execution Control layer covers the monitoring and performance management functions: Earned Value Management, key performance indicator tracking, change management protocols, and risk register maintenance. This layer generates the feedback signals that allow the Strategic Layer to make informed decisions about replanning, resource reallocation, or scope adjustments. Without active EVM or equivalent performance measurement, the through planning architecture loses its adaptive capability and becomes a static document rather than a live coordination system.

The Stakeholder Communication layer cuts vertically across all others, providing the information flows that keep all participants informed of project state, decisions, and changes. Regular communication cadences, structured reporting templates, and clearly defined escalation paths are not soft skills adjuncts to project management. They are operational coordination mechanisms. Sanyaolu et al. (2023) demonstrated that mapping stakeholder influence and interest and aligning

communication formats to different stakeholder types, dashboards for executives, technical logs for engineers, compliance briefs for legal teams, is essential to maintaining trust and avoiding friction in large IT projects [13].

One of the central original contributions of this study is the explicit positioning of resource and workflow coordination as a structural component of through planning rather than an activity that operates separately from schedule integration. Project plans that do not account for realistic team capacity, role readiness, work-in-progress constraints, and inter-team dependencies are systematically incomplete, and the coordination failures they produce can be reduced through deliberate planning architecture.

Figure 3 illustrates the Planning Synchronization Cycle embedded within SEPA, showing how resource, dependency, and execution-control decisions connect to the project planning cycle at six recurring coordination points.



Figure 3. Planning Synchronization Cycle in Large-Scale Projects (compiled by the authors based on [4, 5, 7, 11, 17, 18]).

The six synchronization points in Figure 3 operate at different time horizons, from sprint-level resource allocation to quarterly capacity reviews. The key design principle is that each capacity and dependency decision is explicitly linked to a corresponding planning event, so that changes in team availability, workload, or inter-

team commitments are reflected in the project schedule before they become execution-stage disruptions. In practice, PI Planning events require workstream leads to confirm feasible team capacity for the increment period; monthly stakeholder reviews include capacity and dependency status alongside schedule and budget; and

the IMS contains explicit readiness milestones for critical resources, interfaces, and prerequisite work, not only delivery milestones.

This integration has quantifiable consequences. The author's empirical research on team performance metrics in IT companies found that teams with clearly defined role metrics aligned to project phases show measurably different performance trajectories than teams operating without phase-sensitive measurement systems [14]. The absence of integrated capacity and schedule planning does not produce neutral results. It

creates a specific delay pattern: resource constraints emerge during execution because capacity assumptions were not synchronized with project milestones and dependencies, and the resulting gap is discovered too late for efficient correction.

Table 1 below presents a comparative assessment of the primary coordination mechanisms that constitute the Planning Integration and Team Synchronization layers of SEPA, organized by function, planning horizon, and synchronization impact.

Table 1. Comparative Assessment of Core Coordination Mechanisms in Through Planning (compiled by the authors based on [4, 5, 8, 11, 12, 19, 20]).

Coordination Mechanism	Primary Function	Planning Horizon	Synchronization Impact
Integrated Master Schedule (IMS)	Links all sub-schedules into one timeline	Full project lifecycle	High: enables dependency tracking across all teams
PI Planning (SAFe)	Aligns teams to shared quarterly objectives	8-12 week increment	High: cross-team commitment to joint goals
Scrum of Scrums	Coordinates inter-team impediments weekly	Weekly sprint cycle	Medium: resolves blockers, surfaces dependencies
RACI Matrix	Defines accountability for every decision node	Project setup phase	Medium: reduces role ambiguity, clarifies ownership
Earned Value Management (EVM)	Measures cost and schedule performance	Ongoing monitoring	High: provides objective deviation signal early
Stakeholder Cadence (weekly/monthly)	Maintains trust and information flow	Recurring throughout lifecycle	Medium-high: prevents misalignment escalation

Table 1 reveals a pattern that is operationally important: no single coordination mechanism is sufficient. The IMS provides the structural backbone, but it does not generate commitment. PI Planning generates commitment but operates at a 10-week horizon that misses long-range dependencies. EVM provides deviation signals but only after execution has begun. Stakeholder cadences maintain trust but do not resolve technical integration issues. Through planning as defined in the SEPA framework requires all six mechanisms to be operational simultaneously, with clearly defined handoffs between them. Organizations

that implement only one or two of these mechanisms, which describes the majority of large project failures documented in the literature, are essentially running partial coordination architectures.

Table 2 presents the five cases analyzed in this study, organized by planning approach, schedule outcome, budget variance, and the primary synchronization lever that explains the performance result. The cases provide both positive and cautionary evidence for the SEPA framework.

Table 2. Case Study Outcomes: Through Planning Approaches and Project Performance (compiled by the authors based on [2, 8, 9, 10, 13, 21]).

Case / Project Type	Planning Approach Used	Schedule Outcome	Budget Variance	Key Synchronization Lever
Crossrail (UK, transport megaproject)	IMS + Staged gate reviews	+3.5 years vs. baseline	+52% (GBP 18.7 bn final)	Interface management role introduced mid-project
Large IT Platform Migration (Fortune 500, 2022)	SAFe PI Planning + Scrum of Scrums	+4 weeks (97% on time)	+2.1%	Weekly ART sync + shared OKRs
Public Infrastructure Build (US, 2023)	Critical Path Method + monthly PMO review	+6 months	+19%	Insufficient cross-team capacity planning upfront
Product Launch (Tech Firm, 2024)	OKR-aligned Kanban + bi-weekly sync	On time (delivered in 47 weeks)	-1.8% (under budget)	Visual planning board shared across development, PMO, and delivery functions
Energy Infrastructure Project (Europe, 2023-2024)	IMS + EVM + stakeholder cadence	+8 months	+28%	EVM caught deviation at month 6; recovery plan activated

The cases show consistent patterns. Projects that deployed integrated planning structures with regular cross-team synchronization events, such as the Fortune 500 IT migration and the 2024 technology product launch, delivered results close to plan. Projects that relied on periodic milestone reviews without structured inter-team dependency management, such as the US public infrastructure project and the Crossrail megaproject, experienced substantial overruns even when individual team schedules were reasonable. The Crossrail case is particularly instructive: the project's coordination failure was not primarily a scheduling problem. It was an interface management problem. The four coordination roles identified by Zani, Denicol, and Broyd (2024), meta-organizer, gatekeeper, interface manager, and mediator, were either absent or insufficiently empowered until the project was already in distress [8].

The European energy infrastructure case illustrates a different dynamic. EVM was deployed and did catch a significant deviation at month six of execution. A recovery plan was activated. But the eventual overrun of 28% and 8 months suggests that detection alone is insufficient without a pre-designed response protocol. The SEPA framework addresses this by requiring that the Execution Control layer include not just monitoring tools but documented escalation and replanning protocols, so that when the deviation signal arrives, the response path is already defined.

The technology product launch case, which delivered on time and slightly under budget, used a combination of Kanban-based visual planning shared across development, PMO, and delivery functions, together with bi-weekly synchronization meetings involving the relevant workstream leads. This is a small-scale

operational example of the cross-functional synchronization principle embedded in SEPA: when teams share a visual planning artifact and review capacity, dependencies, and commitments at a regular cadence, emerging mismatches can be resolved in the planning phase rather than after they affect execution.

Implementing through planning is not a binary

choice. Organizations exist at different points on a coordination maturity continuum, and the appropriate implementation path depends on starting position. Figure 4 presents the five-level planning maturity model developed in this study as a diagnostic and roadmap tool for organizations assessing their current coordination architecture.



Figure 4. Five-Level Maturity Model for Through Planning in Large Projects (compiled by the authors based on [1, 2, 5, 7, 8]).

Level 1 organizations operate without a formal coordination plan. Schedules exist within functions but are not networked. Roles are reactive and ambiguous. Stakeholder communication is event-driven rather than structured. These organizations experience the full statistical burden: high rates of cost and schedule overrun, low cross-team cohesion, and planning artifacts that are created at project initiation and consulted infrequently thereafter.

Level 2 organizations have defined a basic Work Breakdown Structure and assigned responsibilities, but functional schedules remain siloed. RACI matrices exist but are inconsistently applied. This is the modal condition for mid-size organizations running projects without a dedicated PMO. Coordination happens but relies heavily on informal relationships between functional leads rather than structural mechanisms.

Level 3 represents the threshold for effective through planning. The IMS is established and maintained. Cross-team synchronization events occur at a regular cadence. Team capacity and resource commitments are connected to the project schedule at least at the phase level. This is where a coordinated project organization begins to emerge. Most of the performance gains documented in

the literature from structured coordination are visible at this transition.

Level 4, the Synchronized level, reflects full SEPA implementation. The five-layer architecture is operational, cross-functional resource and dependency coordination is active, EVM provides real-time feedback, and the stakeholder communication architecture is structured and role-specific. Organizations at this level experience the performance outcomes visible in the positive cases in Table 2: projects that deliver near plan because deviations are detected and resolved before they cascade.

Level 5, the Optimized level, adds predictive analytics and self-correcting planning mechanisms. This is an emerging capability enabled by AI-assisted project management tools. The PMI Pulse of the Profession 2025 report found that 70% of project professionals report their organizations are using or exploring AI in project management, and 80% of PMOs are expected to use AI for decision-making by 2026 [1]. At Level 5, the through planning architecture incorporates predictive risk models that flag emerging deviations before they are visible in conventional EVM signals, and feedback loops are automated enough to generate replan options

without manual analysis.

For most large organizations, the practical implementation target is Level 3 transitioning to Level 4. The investment required to reach Level 5 is substantial, and the marginal gain relative to Level 4 is significant only in projects with very high complexity and long durations.

The SEPA framework is designed to be implementable within existing project organizational structures without requiring wholesale methodology replacement. The implementation follows a ten-step sequence organized around the five SEPA layers. Table 3 presents the full implementation checklist with responsible roles, outputs, and timing.

Table 3. SEPA Implementation Checklist for Large Project Organizations (compiled by the authors based on [4, 5, 7, 8, 11, 12]).

#	Action Item	Responsible Role	Output / Artifact	Timing
1	Establish unified WBS with all team leads	Project Manager + Dept. Leads	Approved WBS document (v1.0)	Week 1-2 of initiation
2	Build Integrated Master Schedule linking sub-schedules	PMO Scheduler	Published IMS in project tool	Week 2-4
3	Complete project capacity plan by role and sprint/phase	Project Manager + Team Leads	Capacity allocation plan, resource readiness timeline	Before execution kick-off
4	Define RACI for all 25+ key decisions	Project Sponsor + PM	RACI matrix (approved)	Initiation phase closure
5	Launch PI Planning (or equivalent milestone review)	Release Train Engineer / PM	Team PI Objectives, Risk board	Start of each execution increment
6	Set up EVM baseline and performance dashboard	PMO Controller	Baseline PMB; weekly EVM report	Week 3-5 of execution
7	Run weekly cross-team sync (Scrum of Scrums or equivalent)	Team leads + PM	Blocker log, updated dependency map	Every sprint / week
8	Conduct monthly stakeholder communication review	PM + Communications Lead	Status report, updated risk register	Monthly
9	Perform quarterly SEPA maturity assessment	PMO + Project Manager	Maturity scorecard (Levels 1-5)	Quarterly
10	Conduct project retrospective and update planning standards	Full project team	Lessons learned register; updated playbook	End of each phase / project

Several design principles underlie this checklist. First, the sequence is not arbitrary. Steps 1 through 4 establish the structural prerequisites for through planning, and the failure to complete them before execution begins is one of the most common and damaging coordination errors in large projects. Organizations frequently proceed to team formation and task assignment before the WBS, IMS, project capacity plan, and RACI are fully established, which means teams begin executing without a shared reference architecture. Second, the project capacity plan in Step 3 is a core planning artifact. It specifies, by role and by project phase, what capacity and skill coverage must be available and when those resources must be ready to support planned milestones and dependencies. Third, the quarterly SEPA maturity assessment in Step 9 is an organizational learning mechanism. It is not an audit. The purpose is to identify which coordination mechanisms are functioning well, which are degrading under execution pressure, and what adjustments are needed to maintain synchronization across the project lifecycle.

The author's research on project metric adaptation to lifecycle stages is directly applicable here: the coordination metrics that matter at project initiation, primarily role clarity and plan completeness, are different from those that matter at execution midpoint, primarily deviation detection speed and replan cycle time, which are different again from those that matter near closure, primarily knowledge capture and handoff completeness [6]. SEPA accommodates this by specifying different monitoring emphases for each lifecycle phase rather than applying a single uniform metric set throughout the project.

A specific author recommendation that extends beyond existing frameworks is the introduction of a designated Planning Synchronization Officer (PSO) role in large projects. Current project organizational structures typically distribute the coordination functions embedded in SEPA across the project manager, PMO scheduler, functional leads, and communications lead, without a single role responsible for the integration between them. The PSO would own the IMS maintenance, chair cross-team synchronization events, manage the RACI currency, and serve as the single point of contact for escalating coordination failures. This role is not equivalent to a project manager. It is a coordination architect embedded within the project

management function, analogous to the interface manager role identified by Zani et al. (2024) but with an explicit cross-functional synchronization mandate [8]. For organizations where a dedicated PSO is not feasible, the functions can be distributed across existing roles with explicit scheduling, but the risk of coordination gap increases proportionally.

Conclusion

This study set out to examine through planning as a coordination instrument in large projects and to propose a practical framework for its implementation. The research confirmed the central hypothesis: through planning, designed as a deliberate multi-layer coordination architecture rather than a scheduling exercise, reduces participant misalignment by creating shared situational awareness, structured escalation pathways, and explicit synchronization points across planning levels and project lifecycle phases.

The analysis established three findings of practical significance. First, the coordination failures that drive large project overruns are not primarily technical. They are structural: the absence of networked planning architectures that connect strategic objectives to team-level execution commitments. The statistics are consistent across industries and geographies. Only 35% of projects meet all goals and timelines [1]. Large projects experience cost overruns at a 58% rate and schedule delays at a 78% rate [10]. These are coordination failures, and they are addressable through planning design.

Second, through planning is effective to the extent that it is structurally complete. The comparative case analysis showed that projects deploying partial coordination architectures, such as an IMS without regular cross-team synchronization events, or PI Planning without explicit capacity and dependency alignment, performed substantially worse than projects where all coordination layers were operational. The SEPA framework provides a complete five-layer specification that closes the gaps most commonly found in large project planning practice.

Third, resource and workflow coordination must be treated as a structural component of through planning rather than as a separate operational activity. The Planning Synchronization Cycle introduced in this study formalizes six synchronization points that operate

at different time horizons and serve different coordination functions. Organizations that separate capacity assumptions and dependency management from the project schedule systematically create execution-stage gaps that become visible only when correction is expensive and disruptive. Integrating capacity commitments, resource readiness, and dependency checks into the IMS and recurring planning events addresses this problem at the structural level.

The practical contributions of the study include the SEPA framework, the five-level planning maturity model, the ten-step implementation checklist, and the recommendation for a Planning Synchronization Officer role in large project organizations. These tools are directly applicable in project management practice without requiring methodology replacement.

Future research directions include primary empirical validation of the SEPA framework through longitudinal case studies in organizations implementing through planning, development of quantitative metrics for the resource and workflow synchronization layer, and investigation of how AI-assisted planning tools affect coordination dynamics at the transition between Level 4 and Level 5 of the maturity model.

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