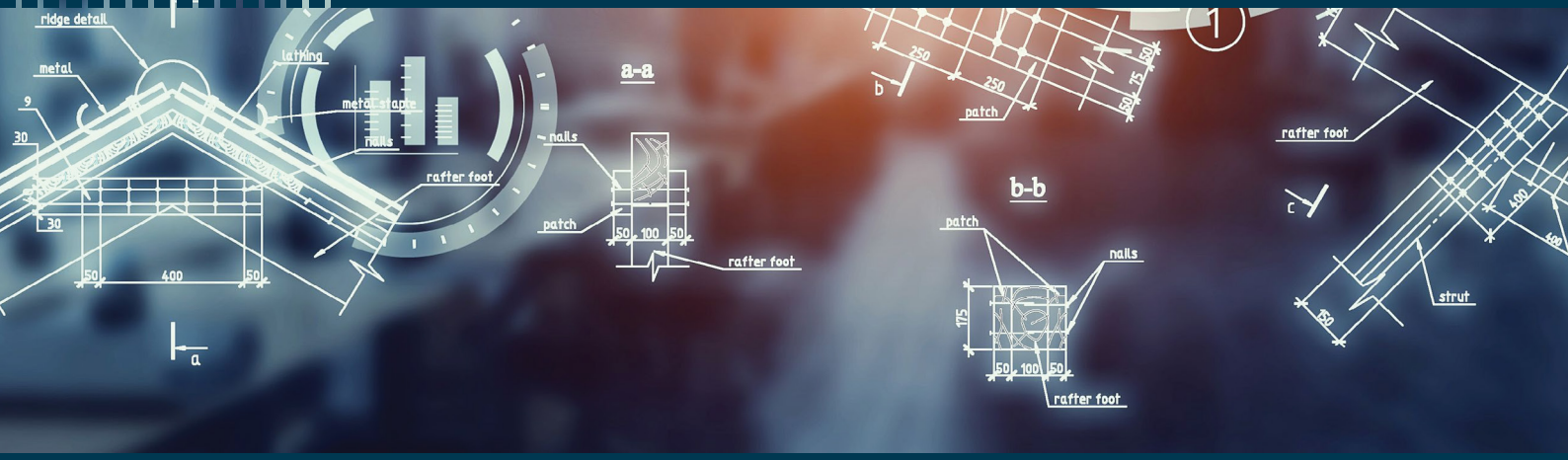
INTERNATIONAL CENTRE FOR COMPLEX PROJECT MANAGEMENT

Rethinking Boundaries in Complex Projects



Navigating the intersections and interplay of functions and stakeholders across the project lifecycle

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Reference as:
Smith, C. & Mathers, N. (2025). *Rethinking Boundaries in Complex Projects: Navigating the intersections and interplay of functions and stakeholders across the project lifecycle*. International Roundtable Series; Canberra: International Centre for Complex Project Management.

Rethinking Boundaries in Complex Projects

Navigating the intersections and interplay of functions and stakeholders across the project lifecycle

Outcomes from the 2024-25 ICCPM International Roundtable Series

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FOREWORD

Operating in an environment defined by complexity, uncertainty, and rapid change, the delivery of complex projects demands more than technical expertise, it requires a fundamental rethinking of how we understand and manage boundaries.

This report represents the outcomes of the 2024–25 ICCPM International Roundtable Series and explores the evolving nature of boundaries in complex projects. It challenges traditional views that treat boundaries as fixed constraints and instead proposes a dynamic, human-centric perspective where boundaries are adaptive interfaces shaped by context, relationships, and purpose.

Drawing on the insights of senior practitioners, academics, and policy makers across industries, disciplines and geographies, this report surfaces the subtle yet powerful forces that influence project success. It highlights the importance of stakeholder co-design, emotional intelligence, cultural translation, and boundary literacy as essential leadership capabilities.

As complex projects increasingly span disciplines, organisations, and lifecycles, this report offers a timely and necessary reframing. It invites project managers and leaders to move beyond silos, embrace systems thinking, and lead with empathy, adaptability, and strategic foresight.

This report is based on the distillation and synthesis of the contributions from in-person workshops held across Australia, Canada, the UK, Vietnam, and online workshops attended by participants across several countries. It draws on the experience and insights of the participants, relevant existing literature and the expertise of ICCPM.

I commend this report to all those navigating the challenges of complex project delivery. May it serve as a guide, a provocation, and a catalyst for more integrated, resilient, and human-centred approaches to spanning project boundaries.

Collin Smith
Managing Director & Chief Executive Officer
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The International Centre for Complex Project Management (ICCPM) is an independent, international, not-for-profit organisation founded in 2007.

As the Peak Body supporting complex project delivery and as the custodian of the Complex Project Leadership Competency Standards, ICCPM provides a central and coordinating role by bringing together leading thinkers and practitioners in the complex project management sector from around the world.

Our objective is to work purposefully to develop and sustain effective collaborations, educate and develop project leaders and organisations across all industry and government sectors on issues of complexity, leading complex projects or programs, and to develop and disseminate practical solutions.

We support the profession through offering a number of training and development programs, thought leadership initiatives, networking events and a range of corporate and individual membership and certification services and benefits.

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ACKNOWLEDGMENTS

We would like to express our appreciation to the participating organisations, financial sponsors, and individual Roundtable participants both in Australia and internationally who gave their time and shared valuable insights and experiences with a view to benefiting others facing similar challenges.

In particular, we would like to thank our Series Supporter, the Australian Department of Defence.

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EXECUTIVE SUMMARY

The delivery of complex projects is increasingly shaped by dynamic environments, evolving stakeholder expectations, and the interplay of diverse disciplines. Traditional models of project management defined by linear phases, fixed scopes, and siloed functions are proving inadequate in addressing the systemic challenges and opportunities that characterise modern project ecosystems.

This report, developed through the 2024–25 ICCPM International Roundtable Series, explores the concept of boundaries in complex projects, not as rigid constraints, but as adaptive interfaces that evolve across the project lifecycle. Drawing on systems thinking, practitioner insights, and roundtable dialogue, the report reframes boundaries as zones of negotiation, coordination, and innovation.

Part 1 – Motivation

This section challenges conventional definitions of projects as temporary endeavours with fixed boundaries. It introduces the idea of projects as open systems embedded within broader contexts; social, political, technological, and organisational. Boundaries are reconceptualised as dynamic interfaces shaped by stakeholder relationships, lifecycle phases, and systemic interdependencies. The motivation for this Roundtable Series was to explore how rethinking boundaries can unlock new models of collaboration, governance, and long-term value creation.

Part 2 – Mapping the Margins of Boundaries in Complex Projects

Here, the report examines the nature and function of boundaries in complex projects. It highlights the paradoxical role of boundaries: they include and exclude, enable and restrict. A typology of boundaries; functional, contractual, cognitive, cultural, and relational is introduced. The section contrasts multidisciplinary and interdisciplinary approaches, advocating for integrated, co-creative collaboration across disciplines. The shift from multidisciplinary to interdisciplinary collaboration is examined, highlighting the need for leadership that can span and integrate across domains. It proposes a new definition of projects as strategic, boundary-spanning endeavours that deliver enduring impact beyond outputs.

Part 3 – Boundary Spanning and Intersection Management in Asset-Based Projects

This section explores how project managers can navigate the interfaces between disciplines such as engineering, procurement, contracting, asset management, HR, and change management. It introduces the concept of boundary objects; shared artefacts that facilitate collaboration across diverse perspectives. Project managers are positioned as integrators, translators, and myth-busters who enable alignment, innovation and systemic coherence. The section also emphasises the importance of lifecycle thinking, sustainment, and leadership capabilities that span organisational and functional boundaries.

Part 4 – Boundary Spanning and Intersection Management in Intangible Projects

In this section we consider the evolving landscape of complex projects, where the traditional focus on tangible, asset-based initiatives characterised by physical infrastructure and defined functional interfaces must be expanded. We turn our attention to a significant proportion of public sector and government whose work now centres on intangible projects, such as policy development, service reform, and social innovation. Unlike asset-based projects, where functional boundaries dominate, intangible projects are shaped by human-centric boundaries such as cognitive, cultural, relational, digital, and temporal. Although not exclusive to intangible projects, these boundaries

are often invisible yet deeply influential, affecting how problems are framed, how solutions are co-created, and how success is defined. Success in such contexts requires boundary-spanning leadership, systemic thinking, and the use of boundary objects to foster shared understanding.

Part 5 – Considerations to Mitigate Interdisciplinary Engagement Challenges

Drawing on insights from the ICCPM Risk in Complexity Special Interest Group (MRC SIG), this section outlines practical strategies to improve interdisciplinary engagement. It addresses stakeholder group dynamics, communication barriers, power imbalances, and regulatory integration. Recommendations include modular planning, performance-based requirements, early regulator engagement, and the appointment of Chief Project Officers. The Human Library model is proposed as a novel approach to capturing and applying lived experience in complex project environments.

Part 6 – Beyond Disciplines - Navigating Human-Centric Boundaries in Complex Projects

This section shifts the focus from technical and disciplinary boundaries to those that are deeply human i.e., cognitive, cultural, emotional, psychological, and temporal. These boundaries influence how projects are perceived, governed, and experienced, often shaping collaboration and decision-making in subtle but powerful ways. It also introduces the concept of eco-system thinking, advocating for a leadership paradigm that moves beyond siloed, ego-centric approaches toward inclusive, adaptive models that prioritise shared purpose and systemic value. It explores how trust, transparency, and co-design underpin effective stakeholder engagement and how psychological safety and emotional intelligence become strategic capabilities in complex environments. Ultimately, navigating human-centric boundaries is not a peripheral task, it is central to complex project leadership. Success depends on leaders who can span these boundaries with empathy, adaptability, and systemic foresight.

Part 7 – Governance as an Enabler in Boundary Spanning Projects

This section reframes governance from a constraining compliance function to an enabling capability that supports adaptive, interdisciplinary collaboration. Traditional governance models rooted in rigid hierarchies and linear control are ill-suited to complex projects operating across fluid boundaries. Instead, governance must evolve to provide enabling constraints: frameworks that set clear parameters for quality and outcomes while allowing flexibility in how these are achieved. Enabling governance is not about abandoning structure it is about designing frameworks that balance accountability with adaptability. By embedding learning, responsiveness, and stakeholder engagement into governance systems, organisations can optimise performance and resilience in complex project environments.

Part 8 – Practical Application Tools

This final section presents two practical tools developed as part of this Roundtable Series. These tools are grounded in the insights and themes explored throughout this report and are designed to assist practitioners in translating theory into action. They are the Interdisciplinary Engagement Maturity Model (IEMM) and the Boundary Integration Maturity Framework (BIMF). Developed in response to the increasing need for effective interdisciplinary collaboration in complex projects, the IEMM provides a structured framework for assessing and improving an organisation's capability to engage across disciplines. The BIMF supports organisations in evaluating how well they manage boundaries, across functions, sectors, and stakeholder groups. It highlights the importance of boundary-spanning roles, governance, and shared understanding in delivering complex outcomes. These tools offer a practical bridge between the conceptual discussions in this report and the operational realities faced by project leaders and organisations.

This report invites project leaders to rethink boundaries not as limitations, but as opportunities for integration, resilience, and systemic transformation. We commend this report to you and hope it provides valuable insights into the nature of boundaries in complex projects.

By rethinking boundaries as adaptive interfaces, project leaders can foster integration, resilience, and systemic impact, delivering not just outputs, but enduring value.

Part 1
Motivation

In the evolving landscape of complex project delivery, traditional models of project management, defined by linear phases, fixed scopes, and siloed functions, are increasingly being challenged. The conventional view, as outlined by PMI, frames projects as temporary endeavours with clear start and end points, bounded by budgets, schedules, and deliverables. Yet, this framing often fails to account for the enduring impact of project outcomes, the lifecycle of assets, and the dynamic interplay of disciplines that shape success beyond completion.

Complex projects are not closed systems. They are embedded within volatile environments, influenced by shifting stakeholder expectations, regulatory changes, technological disruptions, and socio-political dynamics. They are increasingly cross industry, cross sector, international, and even circular in nature. These projects span multiple domains; procurement, contracting, asset management, sustainment, and maintenance, each with its own priorities, language, and metrics for success. When boundaries between these domains are rigidly defined, they can constrain collaboration, obscure interdependencies, and lead to suboptimal outcomes.

This Roundtable Series sought to explore the necessity of rethinking boundaries, not just as structural delineations, but as dynamic interfaces that evolve across the project lifecycle. We invited participants to examine how boundaries are formed, negotiated, and managed; how they influence decision-making, stakeholder alignment, and long-term value creation; and how systems thinking can help reframe boundaries to better reflect the complexity of modern project environments.

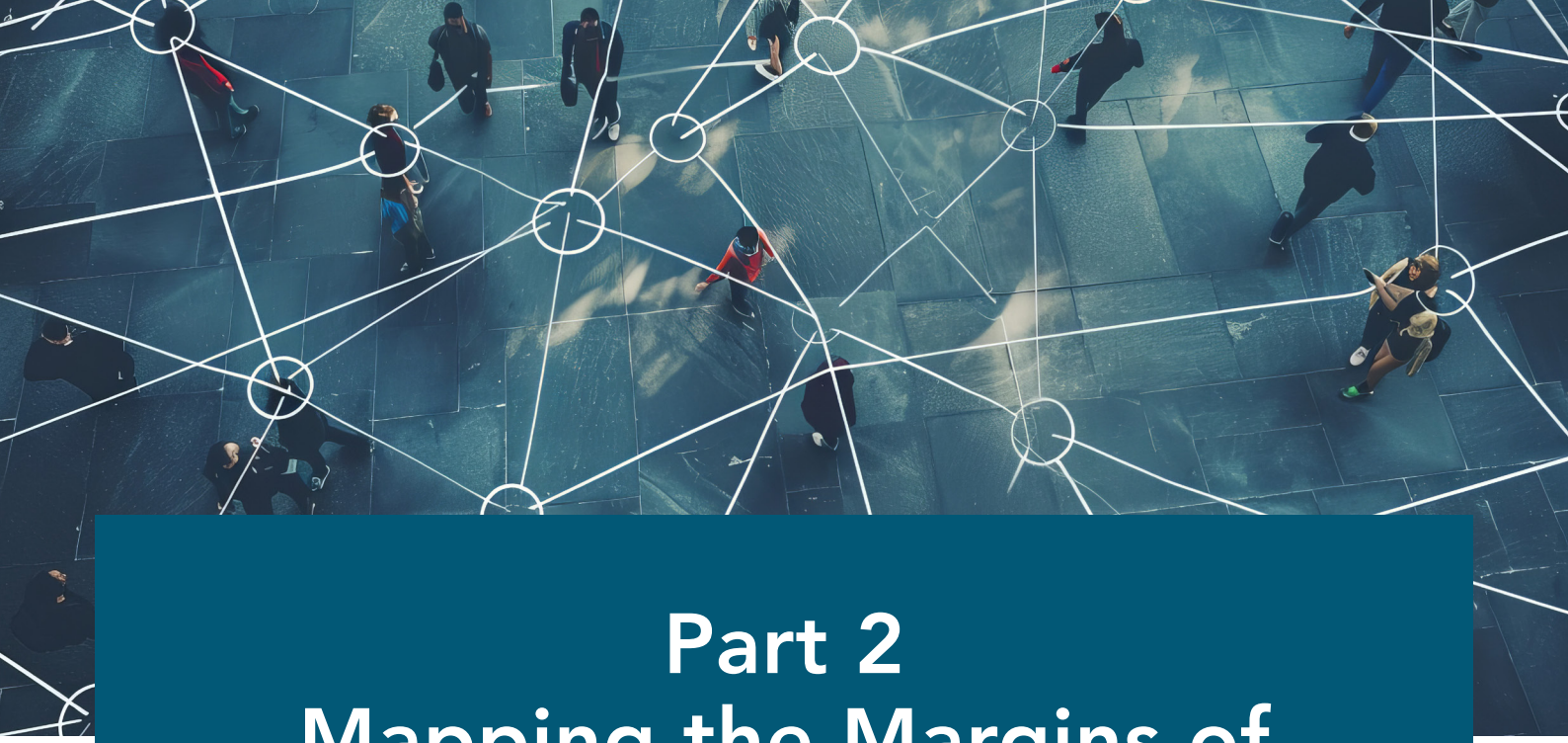
Drawing on systems theory, we recognise that complex projects consist of nested subsystems, each interacting with internal and external contexts. Effective boundary management requires adaptability, transparency, and a

willingness to span disciplines. It demands that project leaders move beyond hierarchical models and embrace intersectional leadership where collaboration, co-design, and shared accountability become central to navigating complexity.

This exploration was not merely a technical exercise. It was a strategic imperative. By reimagining boundaries, we open the door to more integrated, resilient, and purpose-driven project delivery. We challenge the assumptions that underpin traditional project structures and seek to uncover new models of leadership, governance, and stakeholder engagement that are fit for the complexity of the 21st century.

Note to Readers:

In this report, the term Project Manager is used as a collective reference to individuals in core project delivery related roles across various levels. It is not limited to those with the formal job title of Project Manager, but includes professionals responsible for leading, coordinating, and integrating complex project functions.



Part 2
Mapping the Margins of Boundaries in Complex Projects

Rethinking the Traditional View

The traditional view of projects is that clearly defined life cycle phases bound them from initiating, planning, executing, monitoring/controlling, and closing, to deliver defined outputs. According to PMI, all projects are a temporary effort to create value through a unique product, service or result. All projects have a beginning and an end. They have a team, a budget, a schedule and a set of expectations (scope) the team needs to meet[1]. In other words, projects are traditionally viewed as closed systems with predefined boundaries.

However, the benefits realised by the project, including the assets produced as an outcome of the project, have a life after the project. In some sectors, this is being extended to include the reuse of waste and by-products, in an emergent circular economy.

Furthermore, complex projects often entail a multifaceted interplay of disciplines, each contributing crucial elements to the project's success. Among these, procurement, contracting, asset management, sustainment, and maintenance emerge as pivotal domains that effectively serve as boundaries. However, the conventional delineations between these functions can often constrain project efficiency and effectiveness.

What is a Boundary?

In the context of project management, especially within complex projects, a boundary refers to a conceptual 'line' that distinguishes and defines the limits of 'something'. They are always considered in relation to a specific context i.e. the 'something' is of interest to 'someone' and for a particular purpose.

Tensions Associated with Boundaries

Donella Meadows reminds us that "there are no separate systems, the world is a continuum"[2]. Where to draw the boundary around a system depends on the purpose of the discussion. Boundaries are required to make sense of a complex world but problematic because they are arbitrarily created by what we focus on.

If systems are not truly separate, the notion of an artefact existing between a system and its environment becomes questionable. Boundaries arise from our cognitive limitations; we must focus our attention, and in doing so, we construct boundaries.

Boundaries are paradoxical. They include and exclude; they enable and restrict. They mark transitions, beginnings and endings, that are often pluralistic and difficult to manage. For a system to interact with its environment, boundaries must be permeable. Yet to maintain a system's identity, boundaries must also be impermeable. This duality makes boundaries both functional and contested.

Because boundaries are constructed, they are not fixed. They should be reconsidered for each new discussion, problem, or purpose[3].

In complex projects, a sophisticated typology of boundaries emerges, ranging from functional and contractual, to cognitive, cultural, and relational, each shaping how stakeholders interact, negotiate, and influence project outcomes. Some are easily identified, while others require surfacing and interpretation.

"Boundaries expose assumptions"

Participant quote

Some examples of easily discernible and less easily discernible boundaries from the roundtable discussions are shown in the figure below.

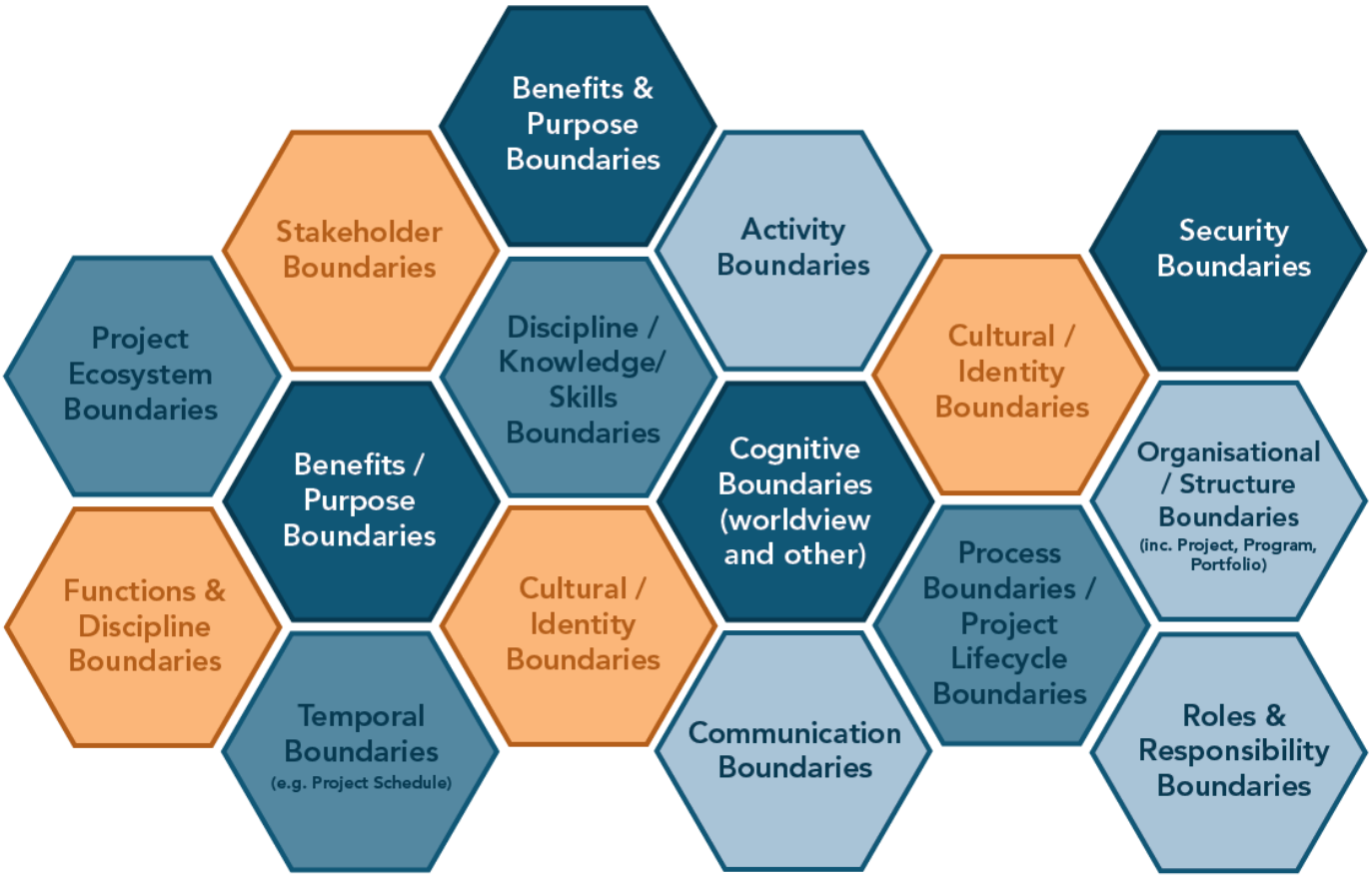


Figure 1: A Sophisticated Typology of Boundaries in Complex Projects

However, as previously stated, boundaries are not always well defined nor are they fixed or rigid. Instead, they are:

1. *Dynamic Interfaces*

Boundaries act as interfaces where different actors, systems, or processes interact. They are shaped by context, evolving needs, and stakeholder relationships.

2. *Zones of Negotiation*

Rather than barriers, boundaries often become negotiation spaces where meaning, accountability, and authority are clarified or contested.

3. *Coordination Mechanisms*

They help manage complexity by delineating areas of focus, but also require bridging mechanisms (like governance structures, communication protocols, or shared tools) to ensure integration across those divides.

4. *Sources of Tension and Innovation*

Boundaries can be sites of conflict due to misalignment or ambiguity, but also of innovation, as diverse perspectives meet and generate new solutions.

Projects as Open Adaptive Systems

Roundtable participants highlighted that recognising complex projects as open systems interacting with their internal and external environments is crucial. This perspective is supported in contemporary systems theory literature and emphasises the flow of information, resources, and feedback between the project and its internal and external context[4]. Identifying and establishing boundaries in complex projects is essential for understanding the scope, inputs, processes, and outputs. This delineation helps in identifying the relevant components and stakeholders[5].

Systems theory recognises the influence of various stakeholders in shaping the project's outcomes, therefore engaging stakeholders in defining project boundaries and negotiating their expectations is critical[6]. Furthermore, systems theory suggests that complex projects are composed of multiple nested subsystems. One such framing of nested systems may include the dynamic and multidisciplinary nature of projects. Understanding the hierarchical relationships and dependencies between these subsystems helps in managing complexity and ensuring coherence in project execution[7].

> ***The number of systems [boundaries] and subsystems [boundaries] that integrate the project, the different methodological and philosophical assumptions [boundaries] across these systems, [the multidisciplinary boundaries] the cross-organisational and schedule interdependencies [boundaries] between activities, and the sheer size and entanglement [boundaries] in the project are all key factors influencing complexity[8] (San Cristobal et al., 2018)***

Systems theory also underscores the need for adaptability and flexibility in managing boundaries, especially in dynamic environments. Projects should be capable of adjusting their boundaries in response to changing circumstances[9].

Roundtable conversations also highlighted that too often, boundaries are set artificially by budget allocations, organisational structures, and functions. It was acknowledged that this siloed, often hierarchical structure works well for simple and complicated aspects of project deliveries, where requirements are well understood, the environment is stable, and efficiencies can be gained by imposing standard processes, shared services, and breaking down

the project lifecycle and tasks, but there was overwhelming agreement that this approach is not appropriate for complex project delivery. This siloed approach can lead to the optimisation of a component of the project to the detriment of later phases, or "kicking the can down the road". In some instances, this is unintentional and stems from a lack of understanding of the needs and limitations of other parts of the project or other functions.

From Multidisciplinary to Interdisciplinary Projects

The terms multidisciplinary and interdisciplinary both describe ways of integrating knowledge and expertise across different fields, but they differ significantly in depth of integration, purpose, and collaboration style, especially in the context of complex systems or projects. The term 'multidisciplinary' has long been associated with large complex projects that require coordination and collaboration across multiple disciplines to achieve project goals and objectives. To that end, complex projects can be viewed as open Multidisciplinary Systems. The diagram below shows examples of different disciplines that may have some overlap in project management.

As roundtable participants pointed out these disciplines each have their own expertise, bodies of knowledge, practices and expectations which guide their thinking and often act as constraints to multidisciplinary collaboration. As one participant said sometimes the problem is the attitude of:

"Good fences make good neighbours"

Participant quote

This highlights the point that when boundaries are drawn too rigidly or simplistically, boundary management can become reductionist. Good boundary management on the other hand is context-sensitive, dynamic, and negotiated, which aligns more with holism than reductionism.

The idea of "scope as a red herring" emerged, suggesting that rigid definitions can obscure the real purpose of the project.

In one of the workshops participants discussed how boundaries shift over time and are often "fuzzy"

"Boundaries are not always a line. Sometimes they are a region"

Participant quote

Figure 2: Projects as Multidisciplinary Systems

Roundtable participants discussed the tension that often exists between disciplines in a collaborative environment each vying for dominance and in accordance with their respective practices and expectations.

"Each disciple is most comfortable within their natural habitat and find it difficult to think about the challenge beyond their own boundaries"

Participant quote

"Perspective is shaped by your field of expertise"

Participant quote

"Success means different things between disciplines based on what that discipline values"

Participant quote

These reflections illuminate the challenge with managing cross discipline functions in delivering complex projects. Consequently, a sub theme that began to emerge across roundtable workshops is the idea of Multidisciplinary versus Interdisciplinary projects. Below is a comparison based on participant contributions.

Multidisciplinary Projects

- Definition: Projects that involve multiple disciplines working in parallel or sequentially on a shared problem, but each retains its own methods, language, and perspective. In other words, each contributing their expertise within their own boundaries.
- Integration Level: Low to moderate. Disciplines contribute side-by-side, not deeply integrated.
- Collaboration Style: Coordinated but discipline specific. Integration happens at the output level.
- Focus: Additive - combining knowledge from different fields without altering the core of each. Delivering defined outputs.
- Strengths:
  - Clear accountability
  - Efficient within known scopes
- Challenges:
  - Risk of siloed thinking
  - Limited innovation across boundaries

Interdisciplinary Projects

- Definition: Projects that transcend disciplinary boundaries, integrating knowledge from diverse fields and stakeholders to co-create new approaches, frameworks, concepts, or solutions.
- Integration level: High. Knowledge is synthesised into a unified approach that goes beyond individual disciplines.
- Collaboration Style: Deeply integrative and co-creative, often involving non-traditional actors (e.g. community groups, policy makers etc).
- Focus: Transformative - creating new ways of thinking and acting that are not confined to a single discipline. Creating systemic, long-term impact (outcomes).
- Strengths:
  - Holistic problem-solving
  - Innovation through synthesis
- Challenges:
  - Requires more time and trust-building
  - Requires complex governance and decision-making

While some roundtable participants were sceptical about the likelihood of ever fully achieving a 'state of nirvana' where projects are truly interdisciplinary, they did acknowledge the importance of aspiring to achieve this ideal. Table1 below shows a summary of the conceptual differences between a Multidisciplinary versus Interdisciplinary view of rethinking boundaries in complex projects.

One thing that became very clear in the roundtable discussions is that moving towards an interdisciplinary approach to project delivery requires much more than technical project management skills, interdisciplinary collaboration and boundary spanning requires leadership skills. The sort of leadership skills that ICCPM describes as Complex Project Leadership.

Feature	Multidisciplinary Projects	Interdisciplinary Projects
Integrations Level	Low to moderate	High
Collaboration Style	Parallel, discipline-specific	Co-creative, boundary-transcending
Stakeholder Involvement	Mostly technical / professional	Includes community, policy, and others
Knowledge Outcomes	Combined expertise	New shared frameworks
Project Focus	Delivering defined outputs	Creating systemic, long-term impact
Boundary Role	Maintained for clarity	Blurred for innovation

Table 1: Multidisciplinary Projects vs Interdisciplinary Projects

Redefining What a Project Is

Roundtable participants acknowledged that most modern-day projects, at least those of any significance, are no longer simply a temporary effort to deliver a defined output. In the context of an ever-increasing complex delivery environment, a project is a dynamic, boundary-spanning endeavour that orchestrates diverse disciplines, stakeholder interests, and lifecycle phases to create enduring value.

Projects operate across fluid interfaces; where procurement meets sustainment, where contracting intersects with asset management, and where stakeholder domains overlap. These boundaries should not be seen as barriers, but rather as spaces of negotiation, coordination, and innovation.

The project's impact extends beyond its formal closure, influencing systems, communities, and future initiatives. In this view, a project is not just a delivery mechanism, it is a **strategic platform for transformation**, embedded within a broader ecosystem of change.

Therefore, we propose an alternative definition of what a project is:

"A project is a dynamic, boundary-spanning endeavour that orchestrates diverse functions, disciplines, and stakeholder interests across a lifecycle to create value; not only through its outputs, but through its enduring impact, adaptability, and integration within broader systems". - ICCPM

Key Shifts from the Traditional Definition:

- **From Temporary to Transitional**
  Projects are not just temporary efforts; they are transitional mechanisms within larger systems, often influencing and being influenced by what comes before and after.
- **From Outputs to Outcomes and Legacy**
  The focus expands from delivering outputs to realising long-term benefits, including sustainability, asset reuse, and systemic change.
- **From Silos to Interfaces**
  Projects are no longer confined within functional silos. They operate across fluid boundaries, requiring negotiation, coordination, and innovation at the intersections.
- **From Control to Collaboration**
  Success depends less on rigid control and more on adaptive collaboration across roles, contracts, and organisational domains.
- **From Lifecycle Phases to Lifecycle Networks**
  The lifecycle is not a linear sequence but a network of interdependent phases, each shaped by evolving stakeholder needs and contextual factors.

Key Insights

Rather than viewing boundaries in complex project delivery as fixed constraints, we propose treating them as adaptive interfaces; flexible zones that evolve in response to contextual shifts.

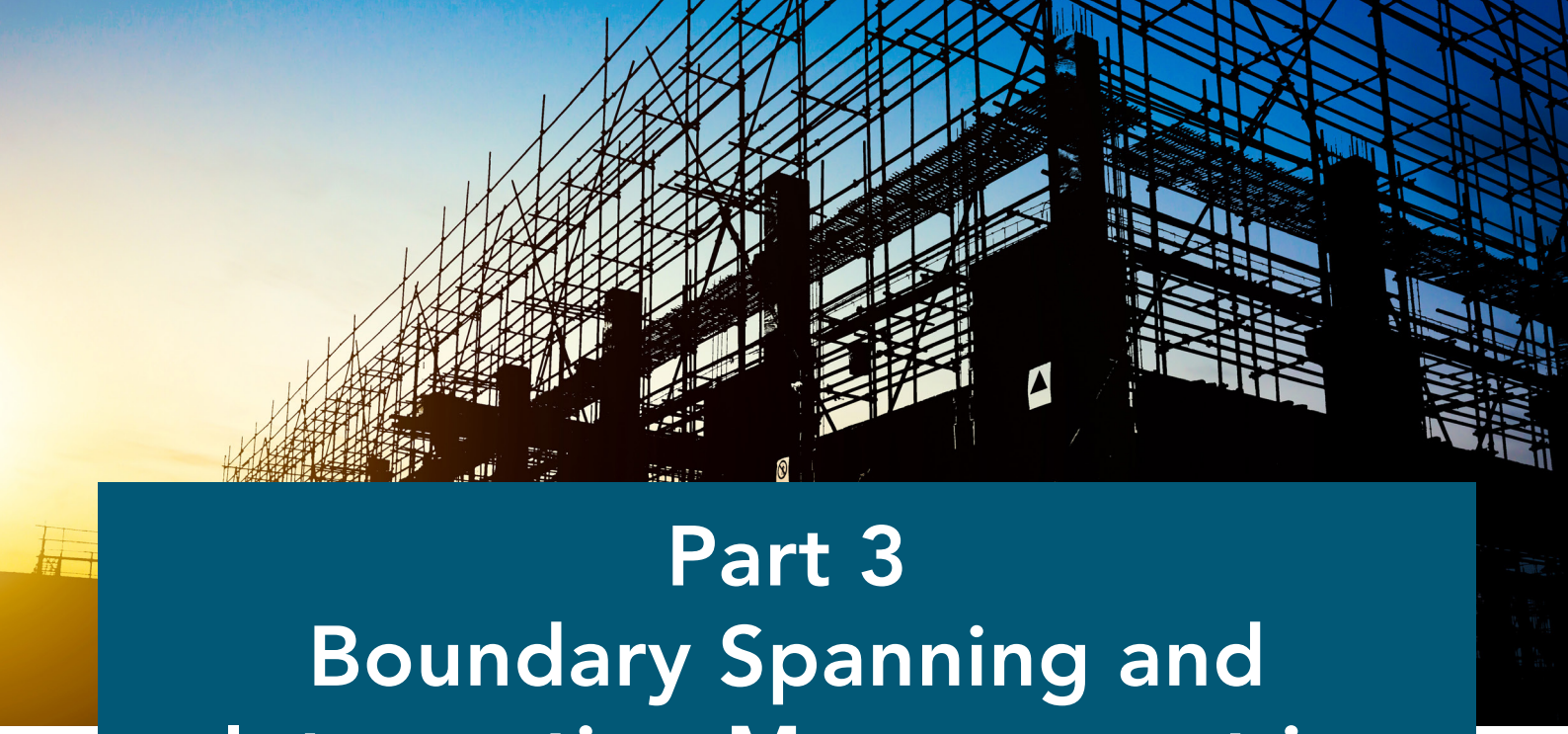
This approach encourages:

- Integration across disciplines (e.g., engineering, procurement, HR).
- Lifecycle thinking that extends beyond project conception to completion.
- Stakeholder co-design and shared ownership of outcomes.
- Continuous learning and feedback loops.

This reframing of boundaries in complex projects introduces key shifts in project thinking:

- From Temporary to Transitional – Projects influence broader systems.
- From Outputs to Outcomes – Focus on long-term impact and legacy.
- From Silos to Interfaces – Emphasis on negotiation and coordination.
- From Control to Collaboration – Adaptive, cross-functional teamwork.
- From Lifecycle Phases to Lifecycle Networks – Interdependent, evolving phases.

Ultimately, managing boundaries in complex projects is not just a technical exercise—it is a leadership challenge. It requires the kind of complex project leadership that can span disciplines, facilitate integration, and enable adaptive, systemic change.



Part 3
Boundary Spanning and Intersection Management in Asset-Based Projects

Roundtable participants acknowledged the interface between different disciplines and subsystems across the lifecycle of a project is vital. Consequently, boundary spanning, and intersection management emerged as important areas of consideration. Effective boundary spanning involves managing interactions, ensuring information flow, and resolving conflicts between these components[10].

The question of which discipline should hold dominance in complex projects remains contentious. While each discipline brings unique expertise, a balanced, collaborative systems approach is essential. Instead of hierarchical structures, a more fluid, adaptive model where expertise is leveraged based on the project phase and requirements may yield superior results[11]. Most roundtable participants were of the view that project management, and therefore project managers, should occupy a leading position in this regard.

"Project managers should act as integrators across boundaries"

Participant quote

"Project management is a value add to operations – or should be!"

Participant quote

Using Boundary Objects to Span Boundaries

Boundary objects are concepts or artifacts that serve as points of connection between different communities, disciplines, or groups, especially when those groups have varying perspectives, expertise, or goals. The term was introduced by Susan Leigh Star and James Griesemer in 1989 in the context of scientific collaboration[12].

Relevance to Complex Projects

In complex projects, especially when interfacing with disciplines like engineering, procurement, contracting, and human resources, boundary objects play a crucial role in enabling collaboration across diverse perspectives and expertise. They bridge gaps between disciplines, stakeholder groups, and organisational silos, making them highly relevant for identifying and managing zones of negotiation.

Key Characteristics of Boundary Objects:

1. *Adaptable to different viewpoints:* They can be interpreted differently by different groups but still maintain enough common identity to be recognisable across contexts.
2. *Facilitate collaboration:* They help bridge gaps in understanding and communication between groups.
3. *Have structure and flexibility:* They are structured enough to be useful but flexible enough to be interpreted differently.

Therefore, boundary objects help translate, coordinate, and align the work of different disciplines without requiring full consensus or identical understanding. They allow each group to work with the same object but interpret and use it in ways that suit their own needs.

Many boundary objects exist across different disciplines as part of each disciplines' standard practice, but they are not typically thought of as boundary objects or used expressly for intersection management. The challenge, therefore, is to identify these boundary objects and consciously use them to develop shared understanding and support system level decision making. Below are some examples including their interface with other disciplines.

Engineering

- Design specifications: Engineers see technical detail; project managers see scope and deliverables; and operations managers see the information they need to estimate operational costs and maintenance requirements.
- CAD models or digital twins: Used by engineers for precision, but also by procurement for materials planning, by contractors for execution and operations managers to plan maintenance and upgrades.
- Technical standards: Serve as shared references across disciplines to ensure compliance and interoperability.

Procurement

- Bill of Materials (BoM): Engineers define components; procurement uses it for sourcing; project managers track cost and timelines.
- Procurement schedules: Aligns engineering needs with supplier timelines and project milestones.
- Vendor evaluation matrices: Used by procurement but also reviewed by project managers and legal teams.

Contracting

- Statements of Work (SoW): Engineers define scope; contractors interpret deliverables; project managers monitor progress.
- Contract documents: Legal teams focus on terms; project managers on obligations and risks; HR may look at workforce implications.
- Risk registers: Shared across PM, legal, and contracting to manage and mitigate risks collaboratively.

Change Management

- Change Impact Assessments:
  Change managers identify affected roles and processes; project managers assess delivery implications; HR evaluates workforce readiness and support needs.
- Stakeholder Maps:
  Communications teams define messaging strategies; project managers track influence and engagement; leadership uses maps to guide sponsorship and alignment.
- Communication Plans:
  Change managers craft narratives and timing; project managers coordinate with delivery milestones; HR ensures messaging supports team cohesion and morale.
- Readiness Surveys:
  Change teams measure adoption preparedness; project managers use results to adjust timelines or training; HR plans interventions to address gaps.
- Training and Support Materials:
  Change managers define learning objectives; HR manages delivery and tracking; project managers ensure alignment with technical rollout and resource availability.

Asset Management

- Asset Registers:
  Engineers contribute technical specifications; finance teams track asset value and depreciation; project managers monitor asset readiness and alignment with delivery milestones.
- Lifecycle Cost Models:
  Asset managers assess total cost of ownership; procurement evaluates sourcing options; project managers use cost insights to inform design and delivery decisions.
- Condition Assessments:
  Operations teams provide performance data; engineers interpret technical implications; project managers use findings to plan upgrades or maintenance schedules.
- Maintenance Plans:
  Asset managers define long-term service strategies; HR ensures workforce capability and training; project managers coordinate timing with project phases and resource availability.
- Sustainability and Resilience Metrics:
  Sustainability teams set performance benchmarks; risk managers assess vulnerabilities; project managers integrate targets into project scope and stakeholder reporting.

Human Resources

- Resource allocation plans: HR sees staffing needs; PMs see task assignments; engineering sees skill requirements.
- Training matrices: HR tracks compliance and development; PMs ensure readiness for project phases.
- Organisational charts: Help all disciplines understand reporting lines and collaboration structures.

Boundary Spanners as Integrators, Translators and Myth-busters

Successful complex project delivery requires individuals and systems that span boundaries between disciplines, phases, and stakeholders. In complex project environments, boundary spanning plays a pivotal role in bridging divides, whether across disciplines, organisations, cultures, or stakeholder groups. Project managers as leaders in this context should operate at the intersections, where ambiguity, misalignment, and competing priorities often converge. As **integrators**, they should synthesise diverse perspectives into coherent strategies and solutions. As **translators**, they should decode jargon, reframe technical language, and facilitate mutual understanding between parties with differing expertise or worldviews. And as **myth-busters**, they should challenge entrenched assumptions, expose hidden risks, and foster a culture of critical inquiry and adaptive thinking.

By navigating and negotiating across boundaries, complex project leaders enable collaboration, reduce friction, and enhance the collective capacity to respond to complexity. This work is often underappreciated but essential, transforming fragmentation into alignment and confusion into clarity, understanding which boundaries are fixed constraints and which are open and flexible, constantly moving and permeable. What follows next are some key considerations for project managers in relation to integrating, translating, and myth-busting the role of different functions or disciplines and project management.

Engineering – more than just technical aspects; it's a bridge between ideas and impact

In complex, interdisciplinary projects, engineering often serves as a boundary discipline (a zone of negotiation), a domain where technical precision intersects with broader strategic, social, and operational concerns. For project managers without an engineering background, navigating this space requires more than coordination; it demands an understanding of boundary objects, shared artefacts like system models, specifications, and design documents, that facilitate communication across disciplinary divides.

These projects thrive on key areas of intersection: where engineering meets policy, user experience, business strategy, and stakeholder values. Recognising these intersections helps project managers interpret engineering contributions not just as technical inputs, but as part of a co-created solution space. By engaging with the mindsets, methodologies, and constraints of engineering, such as systems thinking, iterative design, regulatory compliance, and sustainability and maintainability, project managers can foster more integrated, resilient, and innovative outcomes.

By understanding these boundaries and facilitating interdisciplinary understanding, project managers can help bridge gaps between disciplines and enable more integrated, resilient project outcomes.

Procurement – more than purchasing; it's a strategic interface between project delivery and commercial ecosystems.

Procurement is a strategic discipline that plays a pivotal role in shaping project outcomes, yet it is often misunderstood or underestimated by those outside the field. For project managers who are not procurement specialists, developing a working understanding of procurement principles, processes, and constraints is essential

for effective collaboration and decision-making in complex projects.

Procurement is not just about buying goods and services; it is a zone of negotiation that involves planning, sourcing, contracting, and managing supplier relationships to ensure that project needs are met efficiently and compliantly. Project managers should be aware that procurement decisions are influenced by market conditions, regulatory frameworks, risk profiles, and commercial strategies, not just technical specifications.

One key area of intersection is the development of procurement documentation, such as Statements of Work (SoWs), Bills of Materials (BoMs), and evaluation criteria. These documents often serve as boundary objects between disciplines and must be co-developed with input from engineering, legal, and project teams to ensure clarity and alignment. Misunderstandings at this stage can lead to delays, disputes, or missed opportunities for innovation.

Roundtable participants emphasised that project managers should also understand the importance of early engagement with procurement teams and supply chains. Involving procurement during the planning phase allows for better alignment between project timelines and sourcing lead times and helps identify potential supply chain risks before they escalate. Additionally, procurement professionals bring valuable insights into supplier capabilities, contract structures, and negotiation strategies that can influence project design and delivery.

Bring in suppliers from your supply chain be involved in the early planning phase

Participant quote

Finally, project managers must respect the governance and compliance obligations that procurement teams operate under. These include ethical sourcing, financial controls, and legal requirements that may constrain certain decisions. By fostering open communication, shared planning, and mutual respect, project managers can build stronger partnerships with procurement professionals, ultimately enhancing project integration and resilience.

Contracting – more than legal documentation; it's a bridge between commercial strategy and project execution.

Across roundtable workshops 'contracts' were described as boundary objects that help span disciplines and clarify expectations. Similarly, participant also pointed out the pitfalls of employing the wrong contracting strategy.

Contracting is a foundational discipline in complex projects, shaping the legal, commercial, and operational frameworks that govern relationships between parties. In interdisciplinary environments where diverse fields and stakeholders converge, contracting often serves as a critical area of intersection, linking technical, financial, legal, and strategic domains. However, this opportunity is lost if the contract is developed in isolation without input from these domains, or if standard contract templates are used without consideration of the project needs. For project managers who are not contracting specialists, understanding the principles and practices of contracting is essential to ensure alignment, manage risk, and support successful delivery.

Contracts are more than legal documents, they are strategic boundary objects and zones of negotiation that define scope, responsibilities, deliverables, timelines, and risk allocation. These artefacts enable communication across disciplines by providing a shared reference point that reflects both technical and commercial realities. Project managers should be familiar with key contracting concepts such as Statements of Work (SoWs), service level agreements, performance clauses, and risk registers. When developed collaboratively, these elements help bridge disciplinary gaps and support integrated decision-making.

Effective collaboration with contracting professionals requires early and ongoing engagement. Contracting decisions made in isolation can lead to misaligned expectations, inflexible terms, or missed opportunities for innovation. Project managers should ensure that contracting teams are involved during project planning and design phases, so that the right contracting model can be chosen and the contracts reflect the complexity, interdependencies, and evolving nature of the project.

Have subject matter experts from the operations side at the table at the project acquisition stage to make choices with [commercial strategy and full life cycle] long-term operations in mind

Participant quote

It's also important to understand the constraints contracting professionals operate under, such as compliance requirements, procurement regulations, and legal risk management. These constraints may limit flexibility or require specific processes that affect project timelines and stakeholder engagement. By understanding these boundaries and facilitating cross-functional dialogue, project managers can help ensure that contracts support not hinder project execution.

Ultimately, project managers who understand the strategic role of contracting and build strong relationships with contracting teams are better equipped to manage complexity, resolve disputes, and deliver value across the project lifecycle. In interdisciplinary projects, this understanding is especially vital, as contracts often serve as the connective tissue between disciplines, enabling collaboration, accountability, and innovation.

Traditionally, procurement and contracting have been viewed sequentially. However, a paradigm shift is occurring, emphasising a more integrated approach where procurement decisions influence the contracting strategy and vice versa[13]. This evolving relationship necessitates a more nuanced understanding and collaboration between these disciplines[14].

Therefore, thinking of project management as encompassing contract management is critical. Effective contract management is integral to achieving project objectives, as it governs the terms, deliverables, and obligations of parties involved in the project[15]. When done well, it also supports collaboration between project partners rather than introducing a boundary between them.

Change Management – more than communication and managing resistance; it's a bridge between transformation and adoption.

Change management is a critical discipline in complex projects, focused on guiding individuals, teams, and organisations through transitions triggered by new systems, processes, structures, or strategies. In interdisciplinary environments,

where diverse stakeholders and disciplines converge, change management operates at key intersections between technical delivery, human behaviour, organisational culture, and strategic outcomes.

For project managers who are not change specialists, understanding the principles of change management is essential to ensure that project outputs are adopted, sustained, and aligned with stakeholder expectations. Change professionals use structured approaches such as Prosci ADKAR Model, Kotter's 8-Step Model, or other frameworks to plan and implement change. These methodologies help anticipate resistance, build engagement, and support behavioural shifts across the organisation.

Artefacts such as change impact assessments, stakeholder maps, communication plans, and readiness surveys often serve as boundary objects; shared tools that facilitate dialogue between disciplines. These objects help translate abstract change concepts into actionable insights for project teams, enabling alignment between technical implementation and human adoption.

Project managers should engage change professionals early in the project lifecycle to ensure that change considerations, such as stakeholder engagement, communication strategies, and training needs, are embedded in planning and design. This is especially important in projects involving digital transformation, organisational restructuring, or cultural shifts, where technical success alone does not guarantee project value.

Additionally, change management intersects with HR, communications, and leadership. Project managers should understand how these disciplines collaborate to shape messaging, build trust, and foster resilience. By understanding the constraints (boundaries) and expertise of change professionals, such as timing, emotional impact, and organisational readiness, project managers can help ensure that change initiatives are not only delivered but embraced.

Ultimately, project managers who recognise change management as a strategic partner and leverage its tools as boundary-spanning mechanisms are better equipped to lead integrated, adaptive, and people-centred projects in complex, interdisciplinary environments.

Human Resource Management – more than a support function, it is a collaborative project partner at the intersection of people, process, and purpose.

Human resources is a vital discipline and zone of negotiation in complex projects, influencing workforce planning, team dynamics, compliance, and organisational culture. In interdisciplinary environments, where diverse expertise and stakeholder perspectives converge, HR often operates at key areas of intersection, connecting technical, managerial, and cultural dimensions of project delivery. For project managers who are not HR specialists, understanding these intersections is essential to improve collaboration and coordination across project teams.

HR professionals manage recruitment, onboarding, training, performance, and workforce compliance. Staffing decisions are not just about availability, they involve matching skills to roles, ensuring legal and contractual compliance, and supporting long-term workforce sustainability. As explored above, the type of skills needed to be successful in complex projects are different to those required to be successful in controlled environments. HR professionals play an important role in identifying professionals with these skills or developing them in existing team members. Early engagement with HR helps ensure that resource planning aligns with project timelines, technical requirements, and broader organisational goals.

Project managers should also understand the role HR plays in shaping team culture and cohesion. HR policies influence how teams communicate, resolve conflict, and adapt to change. In cross-disciplinary settings, HR

supports diversity and inclusion initiatives, facilitates team building, and helps navigate interpersonal challenges that may arise from differing professional norms or expectations.

Additionally, HR is responsible for managing training and development. Project managers should collaborate with HR to identify skill gaps; schedule training aligned with project phases and ensure readiness for critical tasks. Tools such as training matrices, resource allocation plans, and competency frameworks often serve as boundary objects that help align HR and project goals across disciplines.

By understanding HR's strategic role, project managers can foster stronger partnerships, improve team performance, and enhance the overall resilience of complex projects. In interdisciplinary contexts, HR is not just a support function, it is a collaborative partner at the intersection of people, process, and purpose.

Asset Management – more than maintenance; it's a bridge between project delivery and long-term value.

Workshop participants identified that one of the barriers to achieving project outcomes and the realisation of the identified benefits, was the separation of project delivery and asset management. When a boundary is placed between these project phases, project delivery is often optimised independently of any consideration of operating and maintaining the asset. They identified that in complex environments; asset management should play a strategic role throughout the entire project lifecycle. For project managers who are not asset management specialists, understanding its principles and long-term focus is then essential for aligning project delivery with enduring value.

Asset management is a strategic discipline and zone of negotiation in complex projects, focused on the lifecycle optimisation of physical and digital assets, from planning and acquisition, to operation, maintenance, and disposal. In interdisciplinary environments, asset management intersects with engineering, finance, operations, sustainability, and risk management, making it a key area of integration that project managers must understand to support long-term value creation.

For project managers who are not asset management specialists, effective collaboration begins with recognising that asset decisions are not just technical or financial, they are multi-dimensional, involving trade-offs between performance, cost, risk, and stakeholder priorities. Asset managers work within structured frameworks such as ISO 55000, which emphasise value, alignment, leadership, and assurance. Understanding these principles helps project managers align project delivery with broader asset strategies.

Tools such as asset registers, lifecycle cost models, condition assessments, and maintenance plans often serve as boundary objects that facilitate dialogue between disciplines. These objects help translate asset-related data and priorities into actionable insights for project teams, enabling informed decisions about design, procurement, and operational readiness.

Project managers should engage asset management professionals early in the project lifecycle to ensure that asset considerations, such as maintainability, operability, and total cost of ownership are embedded in project planning and design. This is especially important in infrastructure, defence, and public sector projects, where asset performance and longevity are critical to stakeholder outcomes.

Additionally, asset management is closely tied to risk and resilience. Project managers should understand how asset strategies influence risk mitigation, redundancy planning, and service continuity. By respecting the constraints and objectives of asset management, such as regulatory compliance, sustainability targets, and performance benchmarks, project managers can help ensure that project outputs are not only delivered but sustained over time.

Ultimately, project managers who appreciate the strategic role of asset management and engage with its tools and frameworks as boundary-spanning mechanisms are better equipped to deliver integrated, resilient, and value-driven outcomes in complex projects.

This is a particularly important boundary to span as organisations look to introduce minimum viable capability and minimum viable product with the view to further maturation in operation. On the one hand, this can be viewed as a continuous improvement activity, but the success of this approach is reliant on agreement on the boundary for "minimum viable" and ensuring that there is an excellent working relationship and understanding between the groups that are jointly continuing development whilst supporting operation.

Sustainment and Maintenance: A Continual Feedback Loop

Sustainment and maintenance are integral components of the project life cycle. Rather than isolated activities, they represent a continuum that influences project design, procurement decisions, and asset management strategies. Understanding this interconnectivity is crucial for ensuring project durability and longevity[16].

Sustainment and maintenance are integral components of asset management. They ensure that assets continue to function effectively, contribute to organisational objectives, and deliver value throughout their life cycle[17].

"Extend the time boundary of the project to deal with handover and enable improved sustainment"

Participant quote

Redrawing Boundaries: Embracing the Full Life Cycle

To fully realise the potential of complex projects, it is imperative to continually test and redefine project boundaries. This entails expanding the scope of concern beyond the traditional project completion point to encompass the entire life cycle of assets. Such an approach promotes a more holistic perspective, ensuring that decisions made at each phase align with the long-term objectives[18].

"A first project approval should not be moving forward if the entire lifecycle (acquisition cost & lifecycle cost) isn't considered"

Participant quote

Boundary-Spanning Capabilities

Project managers play a pivotal role in orchestrating the diverse elements of complex projects and aligning them with the identified project outcomes. They take a systems view and work across boundaries to optimise benefits realisation. Therefore, to excel in this capacity, they must be equipped with a detailed understanding of the interdependence of procurement, contracting, asset management, sustainment, and maintenance and the ability to bring together teams of experts in these areas to develop strategies that are optimised for the system. Training programs should be tailored to foster cross-disciplinary proficiency, enabling project managers to navigate the complexities effectively[19].

However, as highlighted in the key insights section of part 2 of this report managing boundaries in complex projects is not just a technical exercise, it is a leadership challenge. It requires the kind of complex project leadership that can span disciplines, facilitate integration, and enable adaptive, systemic change.

At one of the Roundtable workshops the metaphor of "herding cats" was used to describe the challenge of aligning diverse stakeholders. Leadership in complex projects is fundamentally different from traditional project management. It requires the ability to span boundaries (disciplinary, organisational, cultural, and temporal) and to facilitate integration across diverse domains. Boundary-spanning leaders must be comfortable operating in ambiguity, navigating competing stakeholder interests, and fostering collaboration across silos. Leadership in systems environments involves guiding collective learning and enabling systemic change[20]. This includes recognising when boundaries need to be reinforced for clarity, and when they should be blurred to encourage innovation.

Effective leaders also play a critical role in shaping project culture. They model openness, trust, and curiosity; qualities that support interdisciplinary collaboration and stakeholder co-design. Leadership is not just about directing tasks; it is about orchestrating relationships, facilitating dialogue, and enabling emergence. In complex projects, leadership becomes a relational and strategic function, essential for navigating the tensions and opportunities at the margins of boundaries.

"A good leader is also a follower at times"

Participant quote

As Donella Meadows reminds us from part 1 of this report, boundaries are of our own making and so is the way we manage them. By treating boundaries as adaptive interfaces and zones of negotiation, we can unlock new possibilities for innovation, resilience, and systemic impact. The future of project delivery lies not in rigid frameworks, but in dynamic, boundary-spanning approaches that reflect the complexity of the world we are working in.

High Level Practical Boundary Spanning tips

Given that boundaries are dynamic constructs:

- Regularly revisit scope, stakeholder roles, and constraints as the project evolves.
- Use boundary mapping workshops to identify where boundaries are rigid, fuzzy, or shifting.
- Schedule quarterly "boundary health checks" with your team to assess whether current definitions still serve the project's purpose.
- Use boundary objects like shared dashboards, co-authored documents, and joint planning sessions.
- Create a cross-functional integration team with representatives from each major discipline to co-design key deliverables.

Key Insights

- **Boundary Spanning Is Essential**
  Effective management of interfaces between disciplines and subsystems is critical. Boundary spanning ensures smooth information flow, conflict resolution, and integration across diverse project components.

- **Project Managers as Integrators and Translators**
  Project managers should lead at the intersections, acting as integrators of diverse perspectives, translators of technical language, and myth-busters who challenge assumptions and expose hidden risks.

- **Use of Boundary Objects**
  Artifacts like design specifications, statements of work, and resource plans serve as boundary objects; tools that enable collaboration across disciplines by being interpretable and useful to multiple groups.

- **Procurement and Contracting Integration**
  These functions should not be treated sequentially. A more integrated approach improves alignment and decision-making, especially when suppliers are involved early in planning.

- **Asset Management Starts Early**
  Asset management should be embedded from project inception, not just post-completion, to optimise lifecycle value and align with long-term goals.

- **Sustainment and Maintenance as a Feedback Loop**
  These are not end-stage activities but ongoing processes that influence design, procurement, and asset strategies throughout the project lifecycle.

- **Leadership Beyond Boundaries**
  Leading complex projects requires more than technical skill, it demands relational leadership that spans disciplines, fosters collaboration, and enables systemic change. Leaders must be comfortable with ambiguity and skilled in guiding collective learning.

- **Practical Boundary-Spanning Techniques**
  - Conduct regular scope and stakeholder reviews.
  - Use boundary mapping workshops.
  - Schedule “boundary health checks”.
  - Employ shared dashboards and co-authored documents.
  - Form cross-functional integration teams.

Part 4
Boundary Spanning and Intersection Management in Intangible Projects

Roundtable participants pointed out that in the realm of complex projects, much attention is given to tangible, asset-based initiatives, those with tangible deliverables, physical infrastructure, and well-defined functional interfaces. However, a significant portion of government and public sector work involves **intangible projects** for example policy development, service delivery reform, and social innovation projects. These projects are no less complex, but the nature of their boundaries and the way those boundaries are navigated can differ fundamentally.

While asset-based projects often grapple with boundaries between functional disciplines (e.g., engineering, procurement, contracting etc.), intangible projects require a different lens. These projects operate within open adaptive systems where boundaries are more cognitive, cultural, relational, digital, and temporal. Understanding and navigating these boundaries is essential for achieving meaningful outcomes in environments marked by uncertainty, interdependence, and emergent change.

It's important to recognise that tangible, asset-based projects also encounter these 'softer' human-centric boundaries, as illustrated in *Part 2: Figure 1 – A Sophisticated Typology of Boundaries in Complex Projects*. However, in the context of intangible projects, these boundaries tend to be more prominent and pervasive, often becoming the central focus of coordination, negotiation, meaning making and decision-making.

Unlike asset-based projects where functional interfaces are often the focal point, intangible projects must focus attention on the cognitive, cultural, relational, digital, and temporal dimensions that shape stakeholder engagement, policy coherence, and service outcomes.

Boundary Types in Intangible Projects

Whether in tangible asset-based projects dealing with human-centric challenges or intangible project situations where there is less of a focus on functional disciplines, boundaries are not defined by organisational silos or technical interfaces as much as they are but by mental models, values, relationships, and timeframes.

For example:

- Cognitive boundaries: These arise from differing mental models among stakeholder, assumptions, and interpretations of problems and solutions each interpreting problems and solutions through distinct lenses.
- Cultural boundaries: Particularly relevant in community-based or co-designed initiatives in policy contexts with marginalised populations. However, this may also be applied to organisational culture where different organisations have to collaborate, these boundaries reflect values, norms, and lived experiences that may not align with the lead institutional worldview.
- Relational boundaries: Intangible projects often depend on trust, influence, and power dynamics across networks of actors, often informal and fluid.
- Digital boundaries: arise from legacy systems, data silos, and digital literacy gaps which can hinder integration and innovation in service delivery.
- Temporal boundaries: Political cycles, funding timelines, and long-term societal change often operate on mismatched clocks, creating tension between short-term deliverables and enduring outcomes.

These boundaries are often invisible but deeply influential, shaping how problems are framed, how solutions are co-created, and how success is defined.

Using Boundary Objects to Span Human-Centric Boundaries

In the context of human centric aspects, boundary objects serve as shared reference points that help bridge differences across cognitive, cultural, relational, digital, and temporal boundaries. As mentioned in *Part 3* the challenge, therefore, is to identify these boundary objects and consciously use them to develop shared understanding and support system level decision making.

These objects don't eliminate boundaries but help actors work across them by enabling communication, coordination, and mutual understanding. For more on navigating human-centric boundaries please refer to Part 6 of this report.

Below are examples of boundary objects for each type of boundary:

1. *Cognitive Boundary Objects*

- **Theory of Change diagrams:** Help stakeholders align on how change is expected to happen.
- **Personas or journey maps:** Represent diverse user experiences and perspectives.
- **Policy briefs or synthesis reports:** Translate complex ideas into accessible formats for varied audiences.
- **Facilitated workshops or visual canvases:** Enable shared sensemaking across disciplines.

2. *Cultural Boundary Objects*

- **Cultural protocols or co-design frameworks:** Provide shared rules for respectful engagement.
- **Storytelling artifacts** (e.g., community narratives, digital stories): Convey lived experience in culturally resonant ways.
- **Symbols or metaphors:** Used in cross-cultural dialogue to build shared understanding.
- **Translated materials:** Linguistically and contextually adapted documents that bridge cultural divides.

3. *Relational Boundary Objects*

- **Memoranda of Understanding (MoUs):** Formalise relationships while allowing flexibility.
- **Shared dashboards or collaboration platforms:** Create transparency and mutual accountability.
- **Joint governance structures:** Boards or steering groups that represent multiple interests.
- **Network maps:** Visualise relationships and influence across stakeholders.

4. *Digital Boundary Objects*

- **Interoperability standards:** Enable systems to communicate across platforms.
- **APIs or data schemas:** Provide common formats for data exchange.
- **Digital service blueprints and digital twins:** Map user interactions across systems.
- **User interface prototypes:** Help bridge technical and user-centric perspectives.

5. *Temporal Boundary Objects*

- **Roadmaps or timelines:** Align expectations across short-, medium-, and long-term horizons.
- **Scenario planning tools:** Explore future possibilities and implications.
- **Milestone reviews or retrospectives:** Create structured reflection points.
- **Adaptive planning frameworks:** Allow for iteration and course correction over time.

Aligning Across Boundaries for Collective Impact

Traditional project approaches often reflect siloed thinking focused on control, predictability, and individual agency. Intangible projects, however, demand systemic thinking, where outcomes emerge from collaboration, adaptation, and shared purpose across diverse actors.

This shift involves:

- **Reframing success:** Moving from output-based metrics to outcome-based impact, especially in areas like health equity, social inclusion, or policy reform.
- **Co-creation and participation:** Engaging stakeholders not as passive recipients but as active contributors to design, delivery, and evaluation.
- **Boundary spanning leadership:** Leaders operating across institutional, sectoral, and community boundaries, enabling dialogue and integration rather than enforcing silos.
- **Systemic sensemaking:** Rather than linear planning, intangible projects should adopt iterative learning, reflection, and responsiveness to emergent conditions.

Implications for Project Practice

To support intangible complex projects, project practices must evolve:

- Governance must accommodate ambiguity and shared accountability. (Refer to *Part 7* for more on governance.)
- Planning must be adaptive, allowing for iteration and feedback.
- Engagement must be deep and ongoing, not transactional.
- Measurement must include qualitative insights and narrative data, not just KPIs.

These shifts do not discard traditional project management but augment it with approaches that reflect the systemic, human-centred nature of intangible work.

Intangible projects (non-asset-based projects), and/or human-centric aspects of asset-based projects, challenge conventional boundary thinking by shifting focus from functional interfaces to cognitive, cultural, relational, digital, and temporal boundaries so that leaders can better navigate complexity and deliver outcomes that matter. By recognising and navigating cognitive, cultural, relational, digital, and temporal boundaries, leaders can foster more inclusive, adaptive, and impactful outcomes. This requires a deliberate shift from siloed thinking to systemic thinking where success is not about control, but about connection, contribution, and collective progress.

Key Insights

- Intangible projects such as policy development and service reform operate within open adaptive systems where boundaries are primarily cognitive, cultural, relational, digital, and temporal.
- These boundaries are often invisible but influential, shaping how problems are framed, how solutions are co-created, and how success is defined.
- While asset-based projects also encounter human-centric boundaries, in intangible projects these boundaries are more dominant and pervasive, often becoming the central terrain for coordination and decision-making.
- Boundary objects play a critical role in bridging differences across diverse actors and perspectives. They enable shared understanding, support system-level decision-making, and facilitate collaboration across boundaries.
- Effective delivery in intangible projects requires a shift from siloed, output-focused approaches to systemic, outcome-oriented practices that embrace ambiguity, iteration, and stakeholder co-creation.
- Project governance, planning, engagement, and measurement must evolve to reflect the human-centred and adaptive nature of intangible work.
- Leaders must develop boundary-spanning capabilities, enabling them to work across institutional, cultural, and relational divides to achieve collective impact.

Part 5
Considerations to Mitigate Interdisciplinary Engagement Challenges

Coincidently when ICCPM commenced this Roundtable Series on Reframing Boundaries in Complex Projects the ICCPM Risk in Complexity Special Interest Group (MRC SIG) had decided to explore the topic of Cross-Disciplinary Engagement in Complex Projects. This was rather fortuitous since the SIG effectively acted as a sub-working group of subject matter experts and their insights as captured in their report on the topic dovetail nicely with this Roundtable Series Report. The MRC SIG report entitled ***Considerations for Addressing Cross-Disciplinary Engagement in Complex Projects*** is available separately however we have drawn from that report [with some poetic licence] for the section below which highlights some considerations for complex project leaders to bear in mind when considering the human aspects of collaboration.

Navigating Interdisciplinary Engagement

Even minor misunderstandings can escalate into major issues during the development and execution of complex projects. This challenge is particularly relevant to leaders operating at both the project and strategic organisational levels, as well as practitioners across diverse disciplines, professions, and communities of practice.

Project participants often work from different locations and bring varied disciplinary backgrounds. Some groups naturally exert more influence over project outcomes than others. Communication and collaboration challenges can arise not only between disciplines but also within them, especially when individuals come from specialised subfields or have differing professional experiences. Leaders must remain vigilant and proactive in identifying and addressing these interdisciplinary engagement risks, rather than allowing misalignment or tensions to take hold.

Stakeholder Group Dynamics

Stakeholder groups in complex projects represent distinct disciplines with unique functional responsibilities. For example, the Project Management Office often encompassing risk and contract management, and the client or customer stakeholder group who define project requirements and participate in multi-tiered governance, must both strive for effective cross-disciplinary collaboration.

The client stakeholder group presents a particularly unique case. Its effectiveness often depends on the maturity of the parent organisation in managing complex projects. This includes the ability to process and interpret complex data without oversimplification, enabling informed decision-making at senior governance levels. Where in-house capabilities fall short, external expertise must be engaged. Within the client stakeholder group, relationship management requires integrating diverse disciplinary inputs into a cohesive and collaborative project management approach.

Moreover, the dynamic nature of complex project environments means that required disciplines may shift over time. Even when replicating a previously delivered project, changes in context, such as stakeholder composition, regulatory conditions, or technological developments, can introduce new risks and necessitate revised engagement strategies.

Strong interdisciplinary engagement is built on collaborative relationships across and within disciplines. However, collaboration can falter when individuals lack the motivation, capacity, or authority to engage meaningfully. Tensions may arise, leading to resistance in pursuing "best for project" solutions. These issues are often masked by disciplinary differences, making them harder to diagnose and resolve.

To navigate these complexities, skilled situational leadership is essential. Leaders must foster trust, encourage open dialogue, and create environments where collaboration is not only possible but expected.

Adding to the challenge is a shortage of skilled complex project leaders with the experience and sensitivity needed to manage interdisciplinary engagement effectively. This scarcity is driven by increasing demand for leaders skilled in managing complexity in projects, but also an increasing demand for these skills in aligned areas such as policy development, business and government relations. Although professional development is available, these skills take time and experience to master.

In such a constrained talent market, extra care must be taken to ensure that interdisciplinary engagement is not only prioritised but actively supported.

Operating in a Multi-Lingual Environment

Multidisciplinary engagement is akin to operating in a multilingual environment. Without standardised terminology across disciplines, misunderstandings can easily arise during planning, execution, problem-solving, and decision-making. While glossaries and dictionaries of terms can help, they are often difficult to create and maintain. Even when available, their size and complexity may lead to neglect or over-reliance on outdated definitions. In-person dialogue, what some refer to as "knees under the table", remains irreplaceable for ensuring clarity and mutual understanding.

From a broader organisational perspective, many enterprises have yet to adapt the "stove-piped" language used by different disciplines in complex project environments. This challenge is often rooted in the difficulty of standardising terminology across diverse fields. Regardless of the type of organisation (public, private, or hybrid), organisational maturity should include mechanisms that support effective interdisciplinary engagement within a tailored complex project ecosystem.

One such mechanism is the use of a well-understood RACI diagram, which clearly defines each discipline's roles and responsibilities: who is responsible, accountable, consulted, or

informed. For example, complex project leaders often rely on RACI diagrams to guide business managers, who tend to favour compliance and streamlined procedures. Without clear direction, these managers may act more like independent regulators than collaborative team members, potentially hindering project integration.

Interdisciplinary engagement within client groups is especially critical during the early stages of complex projects. Business Cases, which serve as foundational documents, are frequently underdeveloped or poorly maintained. This was reinforced by Roundtable participants who identified that there is often limited understanding among the various disciplines involved in their review and approval, leading to misaligned expectations and inconsistent focus on objectives, risks, and constraints which can then cause projects to drift off course. This early work was identified as one of the most significant changes that could be made to improve project outcomes.

Effective interdisciplinary engagement also helps establish clear accountabilities, defining who is responsible for what, and by when. It enables each discipline to recognise when deviations from "business as usual" require special attention. For instance, constructing a new port may seem routine, but if it involves a multidisciplinary and largely unskilled workforce, the complexity and risk profile changes significantly.

Finally, without robust interdisciplinary engagement, the emergence of unexpected risks can lead to a tendency to oversimplify analyses in an effort to improve understanding. While simplification may seem helpful, it often strips away critical nuance, leading to misinterpretation or even allegations of misrepresentation. These downstream consequences can severely damage collaboration and trust among project stakeholders.

Improvement Opportunities for Interdisciplinary Collaboration

This section presents insights from MRC SIG members, reflecting years of collective experience in managing complexity across disciplines. The recommendations aim to support more effective Interdisciplinary engagement in complex project environments at the Project level and the Strategic Organisational level.

Project Level Opportunities

Improving Interdisciplinary Communication Through Shared Terminology and Protocols

To support effective interdisciplinary engagement, client organisations should develop and maintain standardised dictionaries of terminology. These resources should be embedded in project-related contracts and shared with subcontractors to ensure consistent understanding across all parties. For projects involving multiple sectors, customised dictionaries may be necessary to reflect sector-specific language.

When uncertainties arise, face-to-face dialogue should be encouraged to clarify definitions and foster mutual understanding. In addition to formal terminology, teams should adopt inclusive language practices in daily communication. Recommended practices include[21]:

- Considering the language capabilities of others.
- Creating a culture where questions and clarifications are welcomed without fear of reprisal.
- Using plain language where possible, while avoiding oversimplification that may lead to confusion.
- Showing empathy toward those who struggle with communication.
- Valuing diverse perspectives.

In situations where communication challenges are significant, organisations may consider employing interdisciplinary human translators, similar to those used at international conferences. These translators could be retired professionals from relevant disciplines, offering valuable contextual insight. Alternatively, the complex project management ecosystem could maintain a directory of qualified inter-discipline translators to support engagement where needed. These ideas represent useful boundary spanning techniques that may be considered as part of the conversation in *Part 3* of this report.

Empowering Teams

In many organisations, decision-making authority is heavily centralised, with senior governance tiers retaining control. Too often this structure is driven by risk-averse cultures and can hinder progress in complex, multidisciplinary projects, where the constant escalation of issues slows down decision-making and complicates interdisciplinary collaboration.

To address these challenges, organisations should consider empowering project teams with clearly defined decision-making boundaries supported by systems awareness and clear guidelines for escalation of issues. This can reduce delays, improve responsiveness, and foster more effective engagement across disciplines.

Ensuring Balance of Power

In multidisciplinary projects, power imbalances between disciplines can undermine collaboration. When one discipline dominates decision-making, others may feel sidelined, leading to reduced engagement and missed opportunities for valuable input.

To prevent this, organisations should actively promote equitable and candid interdisciplinary engagement. Senior governance bodies play a critical role in maintaining this balance. Where necessary, they should intervene to restore fairness and ensure all disciplines remain meaningfully involved in decision-making.

Establishing a set of 'rules of engagement' approved by senior leadership can help guide respectful and inclusive collaboration across disciplines, fostering a more balanced and productive project environment.

Integrating Regulator Requirements into Project Planning

In projects where regulators are a stakeholder, they are often engaged late in the project lifecycle after key decisions have been made. When treated as transactional support, they may respond without sufficient context, issuing rigid directives that can lead to disputes and unintended consequences.

A more effective approach is to involve regulators from the outset, during project launch and throughout detailed planning. Early engagement allows regulatory requirements to be discussed openly, understood in context, and embedded into the project plan before reaching critical milestones.

This proactive involvement also creates space for innovation, enabling teams to explore creative solutions to complex challenges while remaining compliant. When projects are executed in alignment with a collaboratively developed and approved plan, the likelihood of Interdisciplinary risks and regulatory friction is significantly reduced.

Using Performance-Based Requirements to Enhance Flexibility and Engagement

When acquiring critical services or deliverables, organisations often rely on highly technical specifications, many of which are marked as mandatory. While this approach ensures precision, it can significantly narrow the pool of eligible bidders and limit the successful contractor's ability to innovate or optimise delivery within time and budget constraints.

Moreover, communicating detailed specifications across multiple disciplines, and often across language barriers, can increase

the risk of misinterpretation, leading to failed engagements and downstream complications.

An alternative is to adopt performance-based requirements, which focus on desired outcomes rather than prescriptive methods. This approach simplifies interdisciplinary communication, encourages innovation, and allows suppliers greater flexibility in how they meet project goals; ultimately reducing complexity and improving project outcomes.

Decoupling to Manage Complexity in Technically Integrated Projects

Complex projects often involve a high degree of technological integration, which can become overwhelming. Beyond the inherent complexity of individual subsystems, their interconnections introduce additional layers of difficulty that can negatively impact schedules and budgets.

These projects frequently suffer from excessive coupling; where complex systems are tightly linked to other complex systems, often across global supply chains and within rapidly changing environments. To mitigate the associated risks, project teams should aim to decouple or modularise systems wherever feasible.

Effective decoupling requires thorough exploration during the planning phase to identify where modularisation can be applied. A useful engineering guideline is to decouple at points of maximum internal coherence and minimum external dependency; for example, where proven suppliers and subsystems can independently meet performance requirements.

Although this planning and boundary analysis takes time, the resulting efficiency can significantly reduce the need for intensive interdisciplinary coordination and increase the likelihood of successful project delivery.

Building Interdisciplinary Awareness at Project Launch

At the start of a project, stakeholders from different organisations and disciplines often jump to solution-mode from their own perspectives without first fully understanding the project context and challenges. To counter this, project teams can initiate the execution planning phase with a comprehensive all-stakeholder conference, designed to foster shared understanding and collaboration.

Key elements of this approach include:

- **Modular Planning Preparation**
  The project team prepares an initial plan, breaking it into modules classified as simple, complicated, or complex. Complex modules are identified as those likely to differ from typical "business as usual" scenarios.
- **Inclusive Participation**
  Representatives from all relevant disciplines are invited to participate, ensuring broad input during planning and execution. The intent is to inform the project team's approach to the 'big tent' discussion with all the disciplines present who are known to be required to progress the project.
- **Purposeful Dialogue**
  The conference begins by clarifying its purpose: to raise awareness of the project and its initial plan. Participants are encouraged to highlight areas that differ from past experiences and to surface potential challenges, especially those related to terminology and Interdisciplinary engagement.
- **Iterative Planning Mindset**
  Attendees are reminded that planning is iterative and subject to change, fostering openness to adaptation.
- **Tiered Plan Presentation**
  The project team presents the plan in layers of detail, showing how modules interconnect and where dependencies exist.

- **Experience-Based Feedback**
  Participants identify which modules align with their expertise and which present new or difficult challenges. These insights are treated as learning opportunities and contributions to the broader knowledge base.

Following the 'big tent' conference, the project team can integrate the identified complexities into the plan and collaborate with relevant disciplines to explore solutions using tools such as complexity mapping.

This approach offers several benefits:

- Highlights areas requiring sustained interdisciplinary engagement.
- Enables disciplines to share relevant experience, processes, or regulations.
- Encourages early problem-solving and innovation through stakeholder-led insights.
- Supports the development of a more informed and risk-aware project plan.
- Builds common ground for stronger collaborative relationships.

This method aligns with the thinking of Bent Flyvbjerg and Dan Gardner in their book ***How Big Things Get Done*** (2023), which advocates for "starting slow to act fast." By investing time upfront to uncover and address Interdisciplinary risks, teams can reduce surprises and accelerate execution with greater confidence.

Organisational and Strategic Level Opportunities

The Role of Chief Project Officers in Complex Project Environments

In many organisations, especially within the C-suite, there is limited experience with complex projects. This lack of familiarity, combined with impatience and a limited understanding of emerging risks, can lead to frustration and decisions that negatively impact project outcomes.

To address this gap, some organisations are appointing Chief Project Officers (CPOs) at a level just below the CEO. While still relatively rare, CPOs can offer significant value in managing complex projects as follows:

- **Championing Support Ecosystems**
  CPOs advocate for the development and maintenance of internal ecosystems that support complex project teams and integrate emerging practices.
- **Ensuring Fair Funding Consideration**
  Large financial commitments to complex projects often compete with other priorities. A CPO ensures these projects receive fair consideration in funding decisions.
- **Bridging the C-Suite and Project Teams**
  Without a CPO, project leaders may be dismissed as overly cautious when raising concerns. CPOs bring credibility and can effectively communicate risks to senior executives, helping avoid hasty decisions that jeopardise outcomes.
- **Providing Crisis Support**
  During project crises, CPOs can secure empathy and backing from senior governance, reinforcing the project team's position.
- **Strengthening Business Case Integrity**
  CPOs ensure that business cases—both at launch and during reviews—are comprehensive, realistic, and include robust risk assessments and success criteria.
- **Offering Strategic Leadership**
  At critical moments, CPOs provide enterprise-wide guidance, set priorities, and establish a clear tone for project execution.

Gaining Access to Problem-Solving Opportunities

Despite the abundance of documented lessons from past projects, many organisations continue to struggle with applying these insights; particularly in complex, cross-disciplinary environments. This persistent gap raises a critical question: Is producing yet another report that goes unread truly helpful?

To address this ongoing challenge, it's essential to rethink how lessons learned are captured, shared, and applied. One promising approach is the Human Library; a concept designed to foster meaningful conversations and learning through lived experience. In this model, real people serve as "books," offering their personal insights and answering difficult questions in a safe, respectful setting.

Originating in Denmark in 2000, the Human Library now operates in over 80 countries. It provides a framework for open dialogue, helping individuals and teams confront complex issues through direct engagement rather than passive documentation.

Incorporating such models into complex project environments could transform how organisations access and apply problem-solving knowledge; making lessons truly learned, not just observed.

Building Cross-Disciplinary Capability in Project Teams

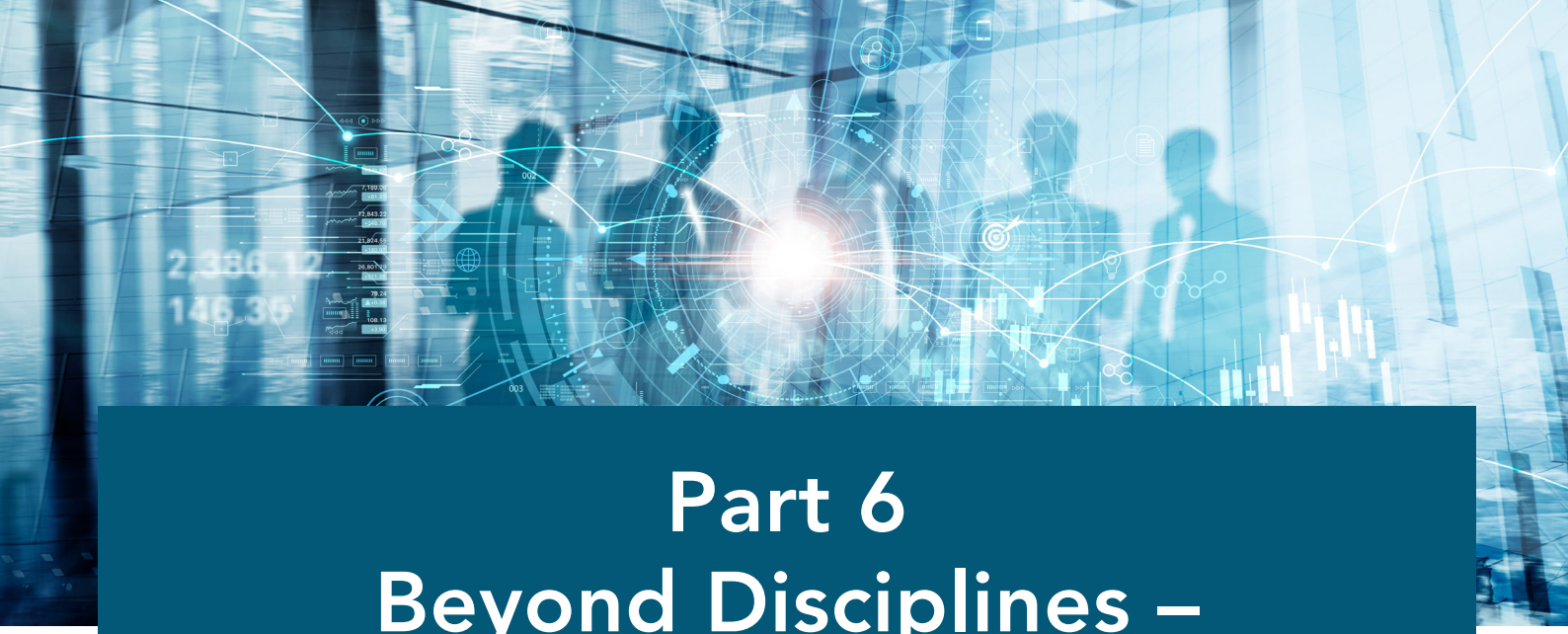
Project practitioners are typically trained in a single discipline. However, some develop expertise in additional fields over time, either through formal learning or practical experience gained across diverse projects. These cross-disciplinary capabilities are a valuable asset, especially in complex project environments.

To strengthen project outcomes, organisations should encourage competency development programs that promote meaningful learning or lived experience across multiple disciplines. This approach not only enhances individual versatility but also improves collaboration and problem-solving within multidisciplinary teams.

Key Insights

To effectively mitigate Interdisciplinary engagement challenges in complex projects, leaders must adopt a proactive, systems-oriented approach that spans both project-level execution and strategic organisational oversight. This includes fostering inclusive communication through shared terminology, empowering teams with delegated authority, and ensuring balanced decision-making across disciplines.

Early and sustained engagement with regulators, performance-based requirements, and modular planning all contribute to reducing complexity and enhancing collaboration. At the organisational level, appointing Chief Project Officers can bridge gaps between governance and delivery, while innovative models like the Human Library offer new ways to capture and apply lessons learned. Ultimately, building cross-disciplinary capability within project teams and cultivating a culture of trust, dialogue, and adaptive leadership are essential for navigating the dynamic and interconnected realities of complex project environments.



Part 6
Beyond Disciplines – Navigating Human-Centric Boundaries in Complex Projects

While much of this report has explored the challenges and strategies associated with interdisciplinary engagement, where distinct professional domains must collaborate to deliver complex projects, there exists another layer of complexity that is less visible but equally critical.

In this part we pick up and explore further the conversation from Part 4 about intangible projects and human-centric boundaries. These are the boundaries that do not align neatly with disciplinary lines, yet they shape how projects are understood, governed, and experienced. These boundaries are human-centric boundaries such as **cognitive, stakeholder relational, human-data relationships, cultural, governance, emotional, psychological and temporal decision-making** and are systemic in nature, they often emerge in the spaces between stakeholder expectations, cultural norms, and technological interfaces.

We turn our attention to these **non-discipline-specific considerations**; the subtle yet powerful boundaries that influence project success. These human-centric boundaries affect how individuals perceive problems and solutions; stakeholder legitimacy and engagement dynamics; differing definitions of success and outcomes; and the foundational roles of trust, transparency, and co-design. By examining these dimensions, we aim to surface the less tangible forces that shape collaboration and decision-making in complex project environments.

From Ego-System to Eco-System Thinking in Complex Projects

Two of the central questions roundtable participants were invited to explore included:

1. What constitutes effective collaboration and co-design among the various interrelated functions in complex projects?
2. What role do complex project leaders play in navigating and leading across diverse boundaries to orchestrate the many elements of a project?

While there does not seem to be a definitive answer to these questions roundtable discussion did lead us to consider the work of Jennifer Crocker and Amy Canevello on ego-system and ecosystem motivation suggesting that that human beings have two motivational systems; the ego-system, which promotes self-centred, self-interested, and egoistic behaviours, and

the ecosystem, which promotes connecting to and caring for others, and describes their characteristic features.

According to Crocker and Canevello, Ego-system motivation involves self-image goals, zero-sum views of the relation between self and others, and feeling "at the mercy" of others.

Eco-system motivation on the other hand, involves compassionate goals, non-zero-sum views of the relation between self and others and feeling "at the source."

The two systems are negatively related, so that when people are motivated by the ego-system, they are less likely to be motivated by the eco-system, and vice versa. Their work considers the implications of these systems for psychological well-being and relationships, particularly how people might use these findings as tools for shifting from one motivational system to another, fostering their desires to connect and belong and shaping their own and perhaps others' psychological well-being and relationships[22].

Eco-System Boundary Leadership Paradigm

This concept can easily be reframed into a conceptual framework for rethinking boundaries in complex projects by shifting the leadership paradigm from ego-system thinking which is siloed and focused on one's own interest (discipline specific) to eco-system thinking which considers the whole network of disciplines that is necessarily interconnected and interdependent.

Below is a comparison of the different perspectives to highlight and support the need to shift leadership perspective in the context of leadership orientation, boundary awareness, stakeholder engagement, decision-making, value creation, system boundaries and interfaces.

1. Leadership Orientation

Ego-System Thinking	Eco-System Thinking
Leader as central authority and decision-maker.	Leader as facilitator, sense-maker, and steward of collective intelligence.
Success is personal and positional.	Success is shared and systemic.

Key Shift: From **control** to **collaboration**.

2. Boundary Awareness

Ego-System Thinking	Eco-System Thinking
Boundaries are rigid and defined by control, ownership, and hierarchy.	Boundaries are fluid, shaped by relationships, shared purpose, and interdependence.
Focus on protecting turf and minimising external influence.	Focus on connecting across domains and leveraging diverse inputs.

Key Shift: From **containment** to **connection**.

3. Stakeholder Engagement

Ego-System Thinking	Eco-System Thinking
Stakeholders are managed and segmented.	Stakeholders are engaged as co-creators and partners.
Communication is transactional.	Communication is relational and generative.

Key Shift: From **management** to **meaningful dialogue**.

4. Decision-Making

Ego-System Thinking	Eco-System Thinking
Decisions are made by the few, based on internal priorities.	Decisions emerge from diverse perspectives and shared understanding.
Risk is minimised by limiting input.	Risk is managed through transparency and distributed insight.

Key Shift: From **closed logic** to **open inquiry**.

5. Value Creation

Ego-System Thinking	Eco-System Thinking
Value is measured by outputs and efficiency.	Value is measured by outcomes, impact, and sustainability.
Short-term gains are prioritised.	Long-term resilience and adaptability are prioritised.

Key Shift: From **transactional value** to **transformational value**.

6. System Boundaries and Interfaces

Ego-System Thinking	Eco-System Thinking
Boundaries are drawn to define "us vs. them"; interfaces are guarded.	Boundaries are permeable; interfaces are designed for learning, adaptation, and co-evolution.

Key Shift: From **defensive separation of boundaries** to **collaborative integration**.

Bridging Stakeholders and Boundaries

In complex projects, stakeholders are not merely participants, they are active agents in shaping the boundaries, scope, and outcomes of the project. As perspective of projects evolve from closed systems to open, adaptive systems, stakeholder relationships become increasingly dynamic and interdependent. This complexity demands a deeper understanding of how stakeholder interests, values, and power dynamics intersect with boundary management.

"Management of stakeholders is a broad term. Ideally define them more as people to identify and engage"

Participant quote

"Investment in personnel relationships from the beginning of the project"

Participant quote

"Interdisciplinary – understand the context e.g. personal issues -people are the hard part"

Participant quote

Stakeholders as Boundary Influencers

Boundaries in complex projects are not static; they are constructed and reconstructed through stakeholder interactions. As noted in part 2 of this report, according to Donella Meadows, boundaries are drawn based on the purpose of the discussion, and in project contexts, that purpose is often contested among stakeholders. Stakeholders influence what is included or excluded from the project system, shaping its identity and scope. This influence is especially pronounced in interdisciplinary environments, where stakeholders may come from diverse sectors, including community groups, policy makers, and technical experts.

"Stakeholders 'boundary' will change as they understand or change views on the project -in a complex project expect you may have some shocks"

Participant quote

"Understanding the ego and motivations of each stakeholder is important. It helps to reduce friction and align individuals toward a shared purpose."

Participant quote

"How do you manage stakeholders' ideas and influence+ keeping a 'finger on the pulse' on what the wider organisation wants"

Participant quote

"Stakeholder could influence project outcome but be not actively engaged"

Participant quote

Mapping Stakeholder Interests and Power

Understanding stakeholder dynamics requires tools that go beyond traditional stakeholder matrices. Influence grids, empathy maps, and boundary maps can help visualise how different actors perceive the project and where their interests align or diverge. These tools support the identification of "zones of negotiation" (Part 2), where boundaries are contested and redefined. Power dynamics also play a critical role; some stakeholders may have formal authority, while others exert influence through informal networks or public opinion.

"We need to 'Negotiate' -balancing stakeholders wishes against project constraints"

Participant quote

"Stakeholders without authority can still derail a project"

Participant quote

"Ongoing engagement of stakeholders are problematic-wrong stakeholder sometimes: need different levels as project progresses - Stakeholder benefit needs to be balanced"

Participant quote

Clarifying Stakeholder Engagement Across the Lifecycle

In complex projects, it is essential to identify and engage the right stakeholders, not simply all possible voices. While inclusivity is important, involving too many stakeholders without clear purpose can slow down decision-making and dilute accountability. Stakeholder legitimacy should be considered carefully, and collaboration must be purposeful. As projects evolve, so too should the stakeholder list. The voices required will shift across the lifecycle, making it important to regularly reflect, iterate, and update stakeholder engagement strategies.

"It's important to identify the right stakeholders—not just include everyone. Too many voices can slow down delivery. Collaborate with purpose. Stakeholder legitimacy matters, and the list of voices should be revisited throughout the lifecycle as needs evolve."

Participant quote

Negotiating Meaning and Accountability

Boundaries are not just technical; they are social constructs that reflect negotiated meanings. In complex projects, stakeholders often hold different definitions of success, shaped by their disciplinary backgrounds and organisational priorities. As one roundtable participant noted:

"Success means different things between disciplines based on what that discipline values."

Participant quote

"Stakeholders all have different expectations- All need to be addressed."

Participant quote

This divergence creates tension but also opens space for innovation, provided that negotiation is facilitated effectively. The shift from outputs to outcomes was a reoccurring theme in the roundtable workshops, with emphasis on benefits realisation. Consequently, success must be defined collaboratively, with attention to stakeholder values, long-term impact, and strategic alignment.

Trust, Transparency, and Co-Design

Effective stakeholder engagement across boundaries requires trust and transparency. Co-design approaches, where stakeholders collaboratively define project goals, boundaries, and outcomes, can help mitigate conflict and foster shared ownership. This aligns with systems thinking principles that emphasise feedback loops and learning. When stakeholders are involved in boundary-setting, they are more likely to support adaptive changes and contribute to long-term project value.

"Start by identifying the root cause to understand how people reconnect. This fosters a sense of agency, enabling productive conflict within a psychologically safe environment. As trust builds, teams become more self-managing and project boundaries become more flexible—shifting focus from rigid processes to meaningful outcomes."

Participant quote

"There are different trust relationships within the team- you don't want to make big decisions without everyone being a part of it, but at the same time you need to make the decisions so the business can move forward"

Participant quote

"Open communication develops trust."

Participant quote

Implications for Project Delivery

Navigating complexity associated with stakeholders is not a peripheral task, it is central to successful project delivery in complex environments. Projects must move beyond static stakeholder plans and embrace dynamic engagement strategies that reflect the evolving nature of boundaries. This requires leadership that can span disciplines, facilitate dialogue, and manage ambiguity; skills that are foundational to complex project leadership.

Digital Boundaries and the Role of AI

As artificial intelligence becomes increasingly embedded in project environments, it introduces new boundaries (digital, epistemic, and relational) that challenge traditional models of decision-making and collaboration as well as opening opportunities for boundary spanning and systems awareness. AI systems are not merely tools; they are agents of transformation that reshape how knowledge is generated, interpreted, and acted upon.

The 2022-23 ICCPM International Roundtable Series explored ***Data Analytics for Informed Decision-Making in Complex Projects: Exploring the Human-Data Relationship***. The full report is available from the ICCPM website, but we draw some important points from that report that relate to rethinking boundaries in complex projects[23].

One of the most profound shifts is the emergence of human-AI boundary negotiation. In complex projects, decisions are often made under conditions of uncertainty, ambiguity, and competing stakeholder interests. AI offers the promise of data-driven clarity, yet AI Systems are not neutral tools, its outputs are shaped by training data, algorithmic assumptions, and design choices that reflect particular worldviews.

As such, they introduce new boundaries between human and machine cognition, requiring project leaders to critically assess when and how AI should be trusted, challenged, or complemented by human insight. Trust, therefore, in AI systems is another critical consideration. Roundtable participants noted that while AI can enhance decision-making, its adoption depends on the perceived legitimacy and transparency of its outputs. Boundary objects such as predictive models, dashboards, and decision-support tools serve as mediators between disciplines, but they must be interpretable, auditable, and context-sensitive to be effective.

Ultimately, the integration of AI into complex projects is not a technical upgrade, it is a redefinition of the human-data relationship.

Project leaders must determine when to defer to machine intelligence and when to assert human judgment. This requires a nuanced understanding of digital boundaries and a commitment to ethical, inclusive, and adaptive governance.

Roundtable participants discussed the introduction of AI as a team member. It was agreed that there was no clear answer as to how to achieve this effectively, but that it would take an openness to work in different ways and to adapt as the team understood what was possible. It was generally agreed that the adoption of AI was an opportunity to support working in a more integrated interdisciplinary way and that better outcomes would be achieved if there was alignment on desired outcomes and investment in the development of skills.

"What happens when one of the stakeholders is AI? Can we afford to ignore Machine Learning?"

Participant quote

"Will human beings believe the AI?"

Participant quote

Cultural Boundaries and Organisational Norms

Culture operates as an invisible boundary in complex projects, shaping how teams interpret risk, authority, collaboration, and success. Organisational norms, whether explicit or tacit, define what is valued, how decisions are made, and how conflict is resolved. These cultural boundaries often go unexamined, yet they profoundly influence project dynamics.

Different organisations bring distinct cultural assumptions to the table. A defence agency may prioritise control and compliance, while a tech startup may emphasise agility and experimentation. When these cultures collide in interdisciplinary projects, misalignment can occur, not because of technical incompatibility, but because of differing values and expectations.

The ability to establish a culture that supports interdisciplinary collaboration and complex project delivery is an example of enabling governance and mature boundary management. Mature organisations recognise the need to adapt their cultural practices to suit the complexity of the project environment. They invest in cross-cultural training, inclusive and adaptive leadership, and mechanisms for surfacing and resolving cultural tensions.

In international projects, cross-cultural collaboration introduces additional layers of socio-cultural complexity. Language, hierarchy, and decision-making styles vary across regions, requiring deliberate efforts to build shared understanding and respect. Project leaders must act as cultural translators, facilitating dialogue, bridging divides, and fostering a culture of openness and learning.

"Offsite/ external events to help bond the relationship. Be mindful of culture specifics."

Participant quote

"In hierarchical organisations, project managers often act as a buffer—shielding teams from top-down pressures and fostering a micro-culture."

Participant quote

"Structural elements will undermine the culture; it's a product of the environment. Shifting structure is difficult."

Participant quote

"Adaptability allows the leader to manage boundaries + provide direction. Build culture greater than an individual person's values"

Participant quote

Emotional and Psychological Boundaries

Complex projects are not only technical and organisational, but they are also deeply human. Emotions, perceptions, and psychological dynamics shape how individuals engage with boundaries, interpret information, and collaborate across disciplines. These emotional and psychological boundaries are often subtle, yet they can be decisive in determining project success.

Cognitive biases — such as confirmation bias, anchoring, and groupthink. These affect how problems are framed, and solutions are evaluated. These biases are shaped by disciplinary training, past experiences, and personal values, creating blind spots that can hinder interdisciplinary collaboration.

Emotional labour — the effort required to build trust, manage conflict, and sustain engagement. This is a critical yet underappreciated aspect of boundary management. In high-stakes environments, project leaders must navigate fear, resistance, and fatigue, while fostering resilience and cohesion.

Psychological safety — is essential for enabling boundary-crossing dialogue. When individuals feel safe to express uncertainty, challenge assumptions, and admit mistakes, boundaries become permeable and generative. Without psychological safety, boundaries harden into silos, and innovation is stifled.

Project leaders must cultivate environments where emotional and psychological boundaries are acknowledged and addressed. This includes modelling empathy, encouraging reflection, and creating spaces for honest conversation. In complex projects, emotional intelligence is not a soft skill, it is a strategic capability.

Key Insights

In complex project environments, boundaries are not solely technical or disciplinary; they are deeply human. This section reframes boundaries as dynamic, human-centric interfaces shaped by cognition, emotion, culture, governance, and stakeholder relationships.

This approach encourages:

- Stakeholder co-design and shared ownership of project boundaries and outcomes.
- Trust-building and psychological safety as foundations for collaboration.

This reframing introduces key shifts in project thinking:

- **From Stakeholder Management to Stakeholder Influence** – Stakeholders actively shape project boundaries and outcomes.
- **From Controlling Governance to Enabling Governance** – Governance must evolve with project complexity and stakeholder dynamics.
- **From Human vs. Data to Human–Data Relationships** – AI and analytics introduce new epistemic boundaries requiring ethical and transparent integration.
- **From Cultural Assumptions to Cultural Translation** – Leaders must bridge organisational and cross-cultural divides to foster alignment.
- **From Emotional Labour to Strategic Capability** – Emotional intelligence and psychological safety are essential for boundary-crossing collaboration.

Ultimately, navigating human-centric boundaries is not just a matter of stakeholder engagement—it is a strategic leadership challenge. It demands boundary literacy: the ability to interpret, negotiate, and reshape boundaries across disciplines, cultures, and systems to enable adaptive, inclusive, and resilient project delivery.

Part 7
Governance as an Enabler in Boundary Spanning Projects

In previous Parts of this report we explored the various boundaries that exist in complex projects and the need to span these boundaries for systems insights and outcomes. We have considered the leadership skills and culture needed to enable this interdisciplinary approach and the need to move from ego-system to eco-system thinking. In this Part we will explore governance as an enabling function to support this way of working.

Governance provides the framework for setting strategic direction and culture. It defines how stakeholder perspectives are included in decision-making and who is empowered to make decisions. As well as ensuring that all laws, regulations and policies are adhered to, the governance function sets expectations regarding ethical behaviour and the tolerance for risk. Finally, governance sets the parameters for measuring success.

Project governance has traditionally been a constraining activity, emphasising compliance with scope, budget and schedule. This approach is well suited to projects where outcomes are predictable but does not transfer to complex projects that operate across fluid boundaries. Traditional governance models, which rely on hierarchical structures and predefined roles, often struggle to accommodate the dynamic interfaces and negotiation zones described in *Part 2*.

Complex projects require enabling constraints; a framework that provides clear system boundaries for quality and outcomes without dictating how these will be achieved. In dynamic feedback-rich environments, decisions are informed by evolving contexts and stakeholder input. This approach to governance enables boundary-spanning and adaptation, allowing decision-making that reflects the interdependencies between disciplines, organisations, and lifecycle phases.

This includes establishing shared protocols, flexible contracting arrangements, and collaborative accountability frameworks that measure outcomes rather than outputs. Governance structures must also support ambiguity and iteration, allowing decisions to evolve as new information emerges. Therefore, governance in open systems must facilitate learning and responsiveness, rather than enforcing rigid control.

When choosing a governance approach, the first step is to identify the project boundary, using the definition presented in *Part 2*. It is then possible to map the various phases, activities, interdependencies and stakeholders to understand the level of complexity and align the governance approach. As the level of complexity increases and projects move towards delivering more intangible human centric outcomes, a more enabling and adaptive governance approach is needed.

We can see from the comparison in *Part 1* how a controlling governance approach is better suited to short-term, temporary projects with well-defined outputs where it is possible to compartmentalise work in silos.

However, when we move to a full lifecycle approach where the project will transition through both known phases and emergent activities, and interfaces must be managed at the systems level to deliver outcomes, enabling governance should be adopted.

This approach focuses on delivering outcomes rather than outputs, managing interfaces rather than isolated silos, and fostering collaboration instead of rigid control. Rather than viewing the lifecycle as a series of discrete phases, enabling governance treats it as a network of interconnected activities, supporting flexibility and systemic coherence. The difference between a controlling governance and an enabling governance approach is summarised in Table 2 below.

How enabling constraints work:

Guide innovation: They provide a context where teams can innovate within a safe space, encouraging new ideas in an uncertain environment.

Force alignment: They cause different agents or team members to align their behaviour, leading to a higher-order system with shared feedback.

Drive feedback loops: They allow for comparison between what was wanted and what was created, which informs the next decisions in a feedback-driven process.

Enhance flexibility: They create a focus for a project while allowing flexibility in how the work is done.

In complex projects, governance establishes mechanisms that integrate diverse perspectives and the use of boundary objects to support interdisciplinary collaboration. This may involve participatory decision-making, stakeholder councils, cross-functional steering groups and the use of dashboards. The challenge lies in balancing inclusivity with efficiency, ensuring that decisions are both representative and actionable. Ultimately, governance must be designed to support boundary negotiation, stakeholder alignment, and systemic coherence.

"Governance requires looking beyond the Project's outputs"

Participant quote

"To have a distributed approach, we need engagement, governance etc occur at the owner level"

Participant quote

"Governance is a collective responsibility."

Participant quote

Understanding that boundaries can be introduced from outside the project, regulatory, security, compliance, company policy, systems governance is needed to evaluate their implications and establish a position that optimises systems outcomes.

Controlling Governance	Enabling Governance
Temporary	Transitional
Outputs	Outcomes
Silos	Interfaces
Control	Collaboration
Lifecycle Phases	Lifecycle Networks

Table 2: Controlling Governance vs. Enabling Governance

Similarly, it is important to note that not all projects will have the same boundary focus and interfaces, for example more intangible human centric projects such a social policy development and large organisational cultural change projects may focus more on cognitive, cultural, relational, digital and temporal boundaries than functional discipline boundaries such as the interface between contracting and procurement or engineering etc, a more enabling adaptive governance approach is needed.

The Tension Between Security and Systems Awareness

When considering where to place hard boundaries and where boundaries should be adaptive or even porous, Roundtable participants raised the challenge of security. Systems awareness is important for optimising systems performance and building trust across interdisciplinary teams. This can be further enhanced by the use of analytics and the use of AI to integrate system data for informed decision making. Counter to this, organisations introduce security policies to limit an individual's access to information and limit their ability to develop systems awareness.

Roundtable participants discussed the impact of getting this balance wrong. Being forced to make decisions based on limited information, the erosion of trust as key stakeholders are excluded from conversations and loss of innovation. It was proposed that the project boundary should include all key stakeholders and that governance should emphasise accountability and traceability.

Temporal Boundaries and Decision Timing

Time itself acts as a boundary in complex projects; shaping what is prioritised, when decisions are made, and how outcomes are evaluated. Temporal boundaries often go unnoticed, yet they profoundly shape project outcomes, they emerge when there is a mismatch between the timing of decisions and the unfolding of their consequences. This is particularly evident in projects with long lifecycles, where early choices have cascading effects that may not be visible until years later.

Legacy systems and past decisions often constrain future options, creating inertia that resists change. Conversely, emerging needs and technologies may outpace existing governance structures, leading to misalignment and risk. Effective boundary management requires temporal awareness; an understanding of how decisions interact with time, and how to balance short-term pressures with long-term value creation.

As previously stated in *Part 2* of this report, roundtable participants emphasised the importance of lifecycle networks, viewing projects not as linear sequences but as dynamic networks of interdependent phases. This perspective encourages decision-makers to consider the full arc of the project, from conception to sustainment, and to anticipate how boundaries may shift over time.

Temporal boundaries also affect stakeholder engagement. Different actors may operate on different time horizons (political cycles, funding windows, operational schedules) requiring coordination and negotiation. Project leaders must be attuned to these rhythms and design governance structures that accommodate temporal complexity.

Roundtable participants emphasised the need to resist the pressure to race to start the project and allow the project governance committee to invest the time at the beginning of the project to understand the project system, the interdependencies, external constraints and to establish the project governance framework to align with the project needs. This includes the ability to manage the timing of activities to align with project requirements not funding cycles. That is to allow the project to define boundaries that support the achievement of project outcomes, not unnecessarily impose external boundaries that impede project success.

Within the roundtable workshops there was a lot

of conversation about the need to not only break down the boundaries between disciplines, but also to resist the imperative to rush to start the project and do the work upfront to understand the system. This includes developing shared understanding of any external constraints, such as regulatory requirements, their implications for the project system.

Boundary Literacy as a Leadership Capability

To navigate the multifaceted boundaries of complex projects, leaders must develop a new kind of literacy — boundary literacy.

Boundary literacy is the ability to read the terrain of complexity; recognising where boundaries exist, how they function, and when they need to be challenged or reinforced. It is a critical skill for leaders navigating interdisciplinary, stakeholder-rich environments. The governance committee may define key boundaries, but it is the ability of all project professionals to work effectively within the system that achieves the desired outcomes.

This is the ability to identify, interpret, and manage boundaries across disciplines, organisations, cultures, and systems. It is a foundational skill for complex project leadership.

Boundary literacy involves recognising where boundaries exist, understanding their function, and determining when they need to be reinforced, blurred, or redefined. It requires fluency in the language of systems thinking, stakeholder engagement, and interdisciplinary collaboration.

Leaders with high boundary literacy are able to:

- Facilitate dialogue across diverse perspectives.
- Use boundary objects to align understanding and expectations.
- Navigate ambiguity and negotiate meaning.
- Challenge assumptions and surface hidden risks.
- Design governance structures that support adaptive decision-making.

Examples of how boundary literacy may manifest in practice:

1. Reframing Scope to Surface Hidden Boundaries

A project manager notices that the scope definition is overly narrow and excludes key lifecycle considerations (e.g. sustainment or asset reuse). By reframing the scope to include long-term outcomes, the project manager reveals hidden boundaries between delivery and operations, enabling more integrated planning.

Manifestation: Recognising that "scope is a red herring" and expanding it to reflect systemic impact.

2. Facilitating Stakeholder Dialogue Across Silos

During a cross-functional workshop, tensions arise between engineering and procurement teams. The project manager uses boundary literacy to surface the assumptions each discipline holds, introduces shared boundary objects (e.g. BoM, SoW), and facilitates a co-design session to align expectations.

Manifestation: Acting as a translator and integrator across disciplines to reduce friction and build shared understanding.

3. Using Boundary Objects to Enable Collaboration

A project manager introduces a shared dashboard that visualises performance metrics relevant to engineering, contracting, and asset management. Each team interprets the data differently, but the dashboard serves as a boundary object that enables coordinated decision-making.

Manifestation: Leveraging artefacts that are interpretable across disciplines to bridge gaps in understanding.

4. Identifying and Managing Temporal Boundaries

In a Public Private Partnership (PPP) project, the project manager recognises that decisions made during procurement will constrain operations decades later. The PM initiates a lifecycle alignment workshop during early phases to ensure that long-term asset performance is considered in bid evaluation.

Manifestation: Anticipating boundary shifts over time and embedding lifecycle thinking early.

5. Challenging Cultural Boundaries to Foster Innovation

A PM observes that rigid organisational norms are stifling interdisciplinary collaboration. They PM then introduces new governance structures that encourage shared accountability and blur traditional reporting lines, creating space for innovation.

Manifestation: Challenging entrenched cultural boundaries and redesigning interfaces to support adaptive leadership.

6. Mapping Boundary Health to Guide Intervention

Using a tool like the ICCPM Boundary Interface Mapping Framework (BIMF) developed as part of this roundtable series (refer to *Part 8*), the PM assesses boundary health indicators (clarity, permeability, alignment, adaptability) across key interfaces. Red zones trigger targeted interventions, such as stakeholder workshops or governance reform.

Manifestation: Systematically diagnosing boundary conditions and responding with context-sensitive actions.

Boundary literacy is not innate—it must be cultivated through experience, reflection, and learning. Training programs, mentoring, and peer networks can support its development. As complex projects become more interconnected and dynamic, boundary literacy will become a core leadership competency for project managers at all levels.

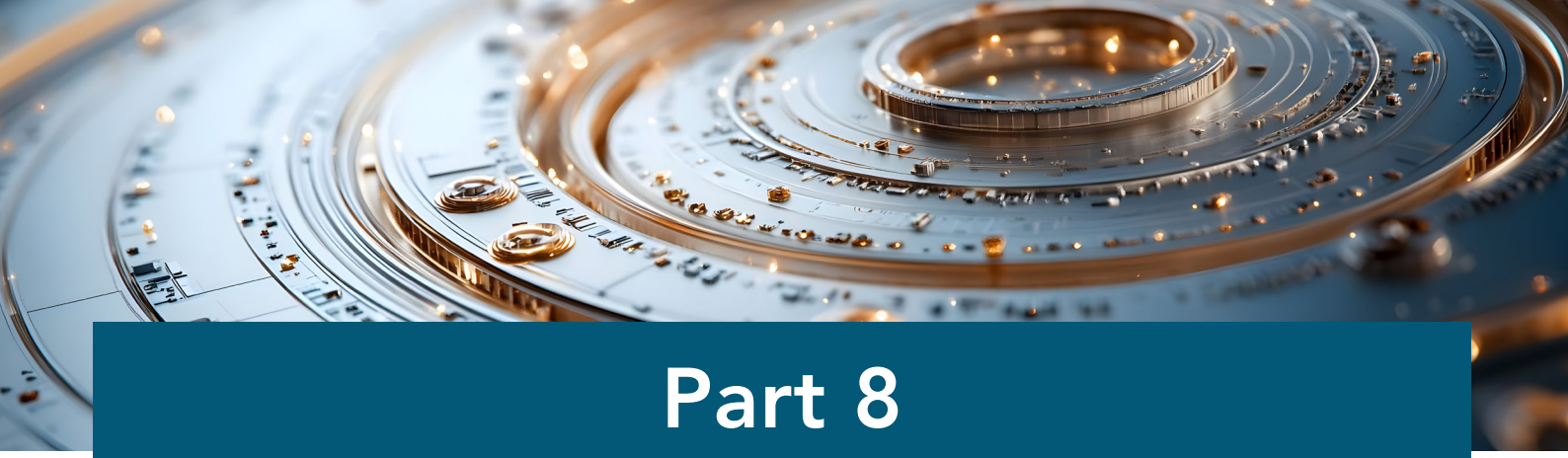
Key Insights

This approach encourages:

- **Adaptive governance** that reflects evolving stakeholder needs and systemic interdependencies.
- **Boundary literacy** as a leadership capability to navigate ambiguity and complexity.

This reframing introduces key shifts in project thinking:

- **From Controlling Governance to Enabling Governance** – Governance must evolve with project complexity and stakeholder dynamics.
- **From Linear Timeframes to Temporal Awareness** – Decisions must reflect lifecycle impacts and shifting stakeholder rhythms.



Part 8
Practical Application Tools

As part of ICCPM's commitment to supporting individuals and organisations in navigating complexity we have developed two practical tools as part of this Roundtable Series. These tools are grounded in the insights and themes explored throughout this report and are designed to assist practitioners in translating theory into action. These tools are introduced here:

Tool 1- Interdisciplinary Engagement Maturity Model (IEMM)

Developed in response to the increasing need for effective interdisciplinary collaboration in complex projects, the IEMM provides a structured framework for assessing and improving an organisation's capability to engage across disciplines. This tool is intended to be indicative rather than definitive; it enables teams to assess their current level of maturity across 5 levels and take targeted steps toward more integrated and transformative collaboration; shifting from viewing complex projects as multidisciplinary to embracing the interdisciplinary approach outlined in *Part 2* of this report. The maturity model is shown in *Figure 3* below.

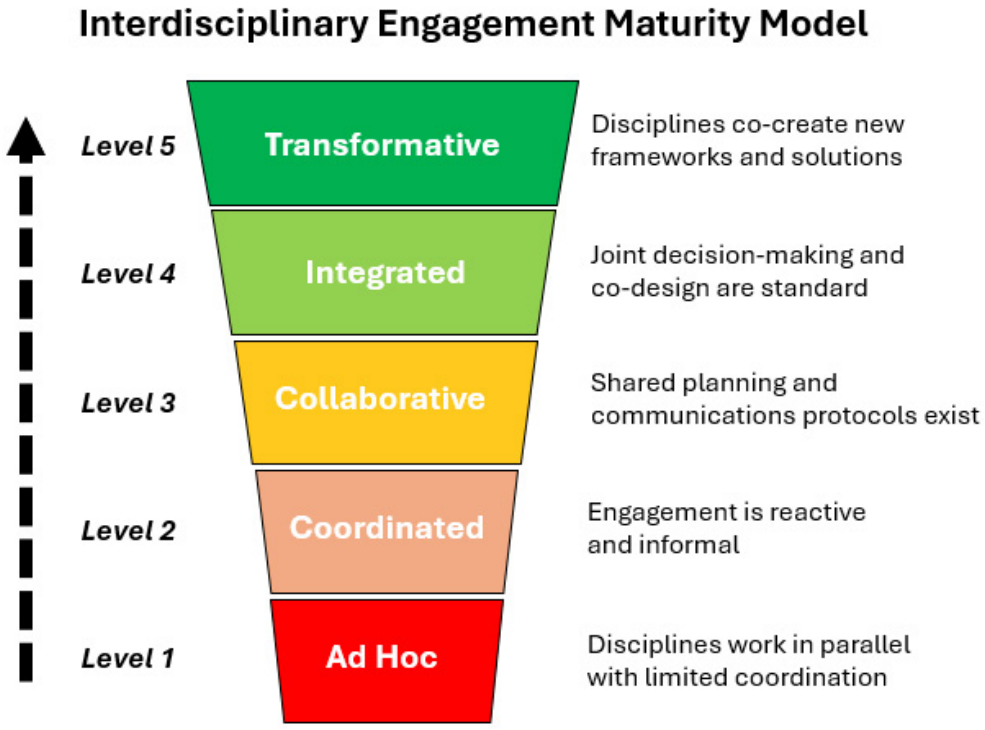


Figure 3: Interdisciplinary Engagement Maturity Model

Snapshot of the IEMM

What is it?

It's a diagnostic and developmental tool. It helps teams or organisations assess where they are in terms of interdisciplinary engagement and identify what they need to improve to handle complex projects more effectively.

Purpose

To assess and improve an organisation's capability to engage across disciplines in complex projects.

Levels

The model defines five maturity levels. Each level reflects the depth of interdisciplinary engagement, from reactive and informal interactions to co-creative and transformative collaboration. The levels and their respective interpretations are shown in *Table 3* below.

Maturity Level	Description	Key Characteristics
Level 1 - Ad Hoc	Disciplines work in parallel	Minimal coordination, siloed efforts
Level 2 - Coordinated	Reactive and informal engagement	Limited integration, basic protocols
Level 3 - Collaborative	Shared planning and communication	Cross-functional teams, joint reviews
Level 4 - Integrated	Joint decision-making and co-design are standard	Unified governance, shared accountability
Level 5 - Transformative	Co-creation of new frameworks and solutions	Systemic innovation, stakeholder co-design

Table 3: Interdisciplinary Engagement Maturity Model (IEMM) Interpretive Table

Dimensions

The model assesses six dimensions that represents a key capability needed for interdisciplinary work namely:

1. Leadership Capability – Do leaders actively support and model interdisciplinary collaboration?
2. Shared Language and Terminology – Do team members understand each other's jargon and concepts?
3. Boundary-Spanning Roles- Are there roles or individuals who connect disciplines effectively?
4. Governance Structures – Are there formal processes that support joint decision-making?
5. Stakeholder Inclusion – Are diverse internal and external stakeholders meaningfully involved?
6. Feedback Loops and Learning Mechanisms – Is there a system for learning from interdisciplinary work and improving it?

Use

It can be used as a:

- Self-assessment tool for project teams or organisations to identify their current level and develop targeted strategies for improvement for example:
  - moving from a Coordinated to a Collaborative level may involve establishing shared planning protocols and cross-functional teams.
  - Advancing to the Integrated level requires joint decision-making and co-design practices.
  - Etc.

The Transformative level represents the highest maturity, where disciplines co-create new frameworks and solutions that transcend traditional boundaries.

Value

It provides a roadmap for evolving from multidisciplinary to interdisciplinary practice. By applying IEMM, organisations can foster more effective interdisciplinary collaboration, reduce friction, and enhance their capacity to deliver complex projects successfully.

How to Use the IEMM in Practice

Step 1: Define the Scope of Assessment

Decide who or what you're assessing:

- A project team
- A department
- The whole organisation
- The Project / Program Ecosystem

Step 2: Use the 6 Dimensions as Assessment Criteria

Each of the six dimensions represents a key capability needed for interdisciplinary work. For each one, assess your current maturity level by ranking the statements in the IEMM survey using a 5-point scale:

1 = Definitely not

2 = Not really

3 = Sometimes

4 = Mostly

5 = Always

Dimension	Guiding Statements	Score
Leadership Capability: *Do leaders actively support and model interdisciplinary collaboration?*	S1. Leaders actively promote interdisciplinary collaboration.	2
	S2. Leaders model behaviours that support cross-disciplinary engagement.	3
	S3. Leadership allocates time and resources specifically for interdisciplinary work.	1
	Average score - Leadership Capability:	**2**
Shared Language and Terminology: *Do team members understand each other's jargon and concepts?*	S1. Team members understand each other's professional language and concepts enough to work in an integrated way.	3
	S2. We have developed shared terminology to bridge disciplinary gaps.	2
	S3. Misunderstandings due to jargon are rare in our team.	3
	Average score - Shared Language and Terminology:	**2.66**
Boundary-Spanning Roles: *Are there roles or individuals who connect disciplines effectively?*	S1. We have individuals who effectively connect different disciplines.	2
	S2. Boundary spanning roles are clearly defined and supported.	1
	S3. These roles are recognised as critical to project success.	1
	Average score - Boundary-Spanning Roles:	**1.33**
Governance Structures: *Are there formal processes that support joint decision-making?*	S1. Our decision-making process includes input from all relevant disciplines.	2
	S2. There are formal structures that support interdisciplinary planning and review.	3
	S3. Governance mechanisms are flexible enough to accommodate diverse perspectives.	4
	Average score - Governance Structures:	**3**
Stakeholder Inclusion: *Are diverse internal and external stakeholders meaningfully involved?*	S1. We undertake internal and external stakeholder engagement early and throughout the project.	3
	S2. Stakeholder input influences key decisions.	3
	S3. We have mechanisms to ensure diverse voices are heard and valued.	3
	Average score - Stakeholder Inclusion:	**3**
Feedback Loops & Learning Mechanisms: *Is there a system for learning from interdisciplinary work and improving it?*	S1. We regularly reflect on and learn from interdisciplinary experiences.	4
	S2. Feedback loops are built into our project processes.	4
	S3. Lessons learned are documented and shared across teams.	4
	Average score - Feedback Loops & Learning Mechanisms:	**4**

Figure 4: Interdisciplinary Engagement Maturity Model (IEMM) Survey

Step 3: Create an IEMM Scorecard

Plot your average scores across the six dimensions on the scorecard below using the average score from each dimension in the IEMM questionnaire. Colour code each dimension according to the colour coding key below:

>1 but ≤2 Red

>2 but ≤ 3 Orange

>3 but ≤ 4 Amber

>4 but < 5 Green

= 5 Dark Green

This gives you a **visual profile** of where your strengths and gaps are across each of the dimensions as well as your overall maturity level to be interpreted using the maturity model shown in ***Figure 5***.

Step 4: Identify Priorities for Development

Focus first on dimensions where:

- You're at Level 1–2, and
- The project complexity demands higher integration

Use this to guide:

- Training programs
- Hiring or role design
- Governance reform
- Process improvement

Step 5: Reassess Periodically

Use the model as a benchmarking tool over time. Reassess after major projects or annually to track progress.

Note: an IEMM functioning spreadsheet tool is available for download on the ICCPM website.

Dimension	Average Score	Colour Code
Leadership Capability	2	Orange
Shared Language & Terminology	2.66	Orange
Boundary-Spanning Roles	1.33	Red
Governance Structures	3	Amber
Stakeholder Inclusion	3	Amber
Feedback Loops & Learning Mechanisms	4	Green
Overall Maturity Level (average of six dimensions)	**2.67**	**Maturity Level 2**

Figure 5: Interdisciplinary Engagement Maturity Model (IEMM) Scorecard.

Tool 2- Boundary Integration Maturity Framework (BIMF)

The BIMF supports organisations in evaluating how well they manage boundaries—across functions, sectors, and stakeholder groups. It highlights the importance of boundary-spanning roles, governance, and shared understanding in delivering complex outcomes.

This tool is not prescriptive but is intended to be adaptable, diagnostic, and developmental. It offers a practical bridge between the conceptual discussions in this report and the operational realities faced by project leaders and organisations.

Snapshot of the BIMF

Purpose

To help project teams visualise, assess, and manage the dynamic interfaces (boundaries) that exist between disciplines, stakeholders, systems, and phases in complex projects.

Components:

The framework categorises boundaries into types such as:

- Boundary Types: Functional, Contractual, Cognitive, Cultural, Relational, Digital, Temporal.

It identifies interface zones where various interactions typically occur:

- Interface Zones:
  - Negotiation – where roles, responsibilities, or expectations are contested.
  - Coordination – where handoffs or dependencies exist.
  - Innovation – where ideas emerge from cross-boundary interaction.
  - Conflict – where misalignment or friction is present.

To evaluate the health of these boundaries, the BIMF introduces boundary health indicators such as:

- Boundary Health Indicators:
  - Clarity (Is the boundary well understood?)
  - Permeability (Can information flow across it?)
  - Alignment (Are stakeholders aligned across it?)
  - Adaptability (Can it evolve with context?)

These indicators help teams determine whether boundaries are well understood, allow for effective information flow, support stakeholder alignment, and can evolve with changing contexts.

The table opposite (*Table 4*) illustrates the types of boundaries, interface zones, and health indicators used to assess and manage complexity across disciplines and stakeholder domains.

Boundary Type	Interface Zone	Health Indicator
Functional	Coordination	Clarity
Contractual	Negotiation	Alignment
Cognitive	Innovation	Adaptability
Cultural	Conflict	Permeability
Relational	Coordination	Clarity
Digital	Negotiation	Alignment
Temporal	Innovation	Adaptability

Table 4: Components of the Interdisciplinary Engagement Maturity Model

Use:

It can be used to:

- Conduct Bondary Mapping Workshops at key project phases.
- To identify rigid, fuzzy, or shifting boundaries using visual tools.
- Apply "boundary health checks" quarterly to assess and recalibrate.

Value:

The framework encourages the use of boundary mapping workshops and visual tools to identify rigid, fuzzy, or shifting boundaries. Regular boundary health checks are recommended to ensure ongoing relevance and effectiveness. By applying BIMF, organisations can reduce siloed thinking, enhance interdisciplinary integration, and proactively manage the complexity inherent in modern project environments.

How to Use the BIMF in Practice

Step 1: Identify Boundary Categories

Use the framework to classify boundaries relevant to your project. Examples may include:

- Functional (e.g. engineering vs procurement)
  - **Interface:** Different disciplines or roles with distinct goals and workflows.
  - **Example:** Engineering wants to optimise design for performance; procurement wants to minimise cost and lead time. Their interface is the decision-making around materials and suppliers etc.
- Contractual (e.g. scope definitions)
  - **Interface:** The boundary between what is agreed upon and what is expected.
  - **Example:** A contractor interprets the scope as excluding testing, while the client assumes it's included. The interface is the contract document and its interpretation.

- Cognitive (e.g. differing mental models)
  - **Interface:** How different individuals or groups conceptualize the same problem.
  - **Example:** A systems engineer sees a project as a set of interdependent modules; a project manager sees it as a timeline of deliverables. The interface is their shared planning tools or meetings.
- Cultural (e.g. organisational norms)
  - **Interface:** Differences in values, behaviours, or expectations across teams or organisations.
  - **Example:** A government agency partners with a private consultancy to deliver a digital transformation project. The public sector team operates with a strong emphasis on transparency, compliance, and risk aversion. Whereas the private sector team prioritises agility, innovation, and commercial efficiency (profitability).
- Relational (e.g. stakeholder trust)
  - **Interface:** Interaction between automated systems and human judgment.
  - **Example:** An AI tool recommends resource allocation based on data; a manager overrides it based on intuition. The interface is the dashboard or decision support system.
- Digital (e.g. AI vs human decision-making)
  - **Interface:** Interaction between automated systems and human judgment.
  - **Example:** An AI tool recommends resource allocation based on data; a manager overrides it based on intuition. The interface is the dashboard or decision support system.
- Temporal (e.g. lifecycle phase transitions)
  - **Interface:** The handover or shift between phases in a project.
  - **Example:** Transition from design to construction involves handing over drawings, specs, and assumptions. The interface is the documentation and review process.

Tip: Use a workshop format with cross-functional teams to brainstorm and list boundaries.

Step 2: Map Interface (boundary) Zones

For each boundary, determine its interface zone:

- Negotiation – where roles, responsibilities, or expectations are contested.
- Coordination – where handoffs or dependencies exist.
- Innovation – where new ideas emerge from cross-boundary interaction.
- Conflict – where misalignment or friction is present.

Tip: Use sticky notes or digital tools to visually map these zones and surface areas of tension and opportunity. This step supports the development of targeted strategies for managing boundary interactions.

Step 3: Assess Boundary Health

Table 5 shows the boundary health indicator and their description.

This assessment helps prioritise boundaries that require intervention and supports ongoing monitoring through regular health checks.

Indicator	Description
Clarity	Is the boundary well understood by all parties?
Permeability	Can information flow across it easily?
Alignment	Are stakeholders aligned in expectations and priorities?
Adaptability	Can the boundary evolve with changing context?

Table 5: Boundary health indicators and descriptions

Apply **Boundary Health Indicators** to each interface:

Tip: Use a simple traffic light system (Green = healthy, Amber = needs attention, Red = problematic).

Boundary	Interface Zone	Clarity	Permeability	Alignment	Adaptability
[e.g. Engineering ↔ Procurement	Coordination	[Green/ Amber/ Red]	[Green/ Amber/ Red]	[Green/ Amber/ Red]	[Green/ Amber/ Red]
e.g. Project Management ↔ Asset Management]	Coordination	[Green/ Amber/ Red]	[Green/ Amber/ Red]	[Green/ Amber/ Red]	[Green/ Amber/ Red]

Table 6: Boundary Integration Maturity Framework Matrix

Step 4: Prioritise and Act

Based on the boundary health assessment, teams should prioritise actions to address red and amber zones.

- Red zones → Require immediate intervention (e.g. facilitated dialogue, governance reform).
- Amber zones → Monitor and support with boundary objects or integration roles.
- Green zones → Maintain and leverage for innovation.

Tip: Assign boundary owners or "boundary spanners" to lead resolution efforts.

Step 5: Revisit Regularly

At the conclusion of the workshop, teams review the boundary map, interface zones, health assessments, and action plans. Key insights are documented and integrated into project planning and governance processes.

Remember boundaries shift over time. Schedule quarterly boundary health checks to reassess and adapt.

Tip: Use this framework proactively in project initiation or as part of phase-gate reviews and or project retrospectives.

Use Case Example

In an infrastructure project:

- Boundary: Engineering ↔ Procurement
- Interface Zone: Coordination
- Health Indicators:
  - **Clarity**: Amber (unclear specs)
  - **Permeability:** Red (poor communication)
  - **Alignment:** Amber (conflicting priorities)
  - **Adaptability:** Green (willingness to adjust)

Action:

Initiate a co-design session using shared boundary objects (e.g. BoM, SoW), assign a boundary spanner, and establish a shared dashboard.

Review Schedule:

- Next review date 2025-12-01
- Participants: Engineering Lead, Procurement Manager, PMO Director
- Focus: improving permeability and alignment across boundaries

Note: A Boundary Interface Mapping Framework (BIMF) Workshop Templates with guidance is available for download on the ICCPM website.

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