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MANAGING STUDIO-BASED RESEARCH CAPACITY IN HIGHER EDUCATION: A PLANNING FRAMEWORK FOR DESIGN-LED KNOWLEDGE PRODUCTION

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The management of research-oriented learning environments has become a central question in higher education, particularly in fields where knowledge is produced not only through text-based scholarship but also through iterative making, visual reasoning, and project-based experimentation. This study examines how the Design Studio may be organized, evaluated, and governed as a research infrastructure rather than treated solely as a pedagogical setting. Using qualitative documentary analysis of a focal architectural research article and its five embedded project exemplars, the paper codes explicit claims about studio-based inquiry, checks the stability of the resulting categories across the exemplars, and translates those categories into the Studio Planning and Research Governance Framework *(SPRGF). The analysis indicates that a research-capable studio is characterized by eight interdependent features: integration of teaching and research, iterative project sequencing, interdisciplinary coordination, technical experimentation, knowledge codification, civic engagement, alignment across personal and societal relevance, and the fusion of practice with inquiry. Within the limits of a single-case documentary design, the paper shows how these features can be used to plan studio briefs, assign staffing, structure assessment, and document research value at course, program, and institutional levels. By repositioning the Design Studio as a governable knowledge-production unit, the study contributes a transparent planning framework for management and planning research in higher education and offers a defensible basis for evaluating design-led project environments without reducing them to criteria external to their disciplinary logic.*

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INTRODUCTION

Across higher education systems, the relationship between teaching, research, and institutional planning has become increasingly consequential. This is especially true in professionally oriented and project-based fields, where universities face simultaneous demands for curricular coherence, demonstrable research capacity, transparent quality assurance, and efficient use of limited resources. In such settings, the conventional distinction between instruction and inquiry is often too rigid to describe how knowledge is actually produced. These pressures have been sharpened by European higher education reforms, which linked degree structures, comparability, and quality assurance more explicitly to knowledge production and innovation across institutions [7, 8]. At the same time, wider methodological discussions in higher education have emphasized that inquiry can be embedded in designed learning environments rather than confined to conventional disciplinary research outputs alone [18]. The central managerial question is therefore not simply whether research should be present in the curriculum, but how research-capable learning environments can be designed, coordinated, documented, and assessed in ways that are both academically credible and administratively legible.

Architectural education offers a particularly instructive case. In this field, design activity does not merely apply previously established knowledge; it frequently serves as a mode of investigation in its own right. This position has deep roots in the idea that design possesses its own epistemic character, often described as a distinct "designerly" way of knowing, while architectural research methodology has increasingly recognized drawings, models, mappings, and prototypes as legitimate instruments of inquiry rather than mere representational outputs [3, 11]. Yet while the epistemic legitimacy of design-led inquiry has been widely discussed, the organizational implications of this position remain underdeveloped. Institutions may celebrate the Design Studio as a creative space, but they often lack a planning framework that explains how such a space should be structured as a durable site of research, educational innovation, and public value.

This study addresses that gap by examining the management and planning implications of studio-based knowledge production. The documentary basis of the paper is Stefano Corbo's article on knowledge and inquiry in architectural design, which explicitly argues that the Design Studio is the key locus where teaching, research, and learning can converge. Rather than treating that claim as solely theoretical, the present paper interprets it as an organizational proposition: if the studio is a research locus, then it must also be understood as a unit requiring governance, sequencing, evaluation, and institutional support [2].

The article pursues three closely related objectives. First, it identifies the main operational characteristics that allow a Design Studio to function as a research-capable environment. Second, it reorganizes those characteristics into a management model suitable for curriculum planning and quality assurance. Third, it subjects that model to a limited internal validation by checking whether the proposed dimensions remain visible across the five project examples documented in the primary text: *Manhattan's Geotaxonomies of the Fantastic*, *Virtual studio space*, *Peeling logistics landscapes, scaffolding the banana industry*, *Learning landscapes*, and *Resilient prototypes*. The inclusion of studio examples of this kind resonates with contemporary attention to studio properties, learning cultures, and experimental teaching formats, including digitally mediated studio environments that make pedagogical structure and interaction visible in new ways [14, 17].

The contribution is positioned within management and planning research in two ways. Conceptually, it translates a disciplinary argument about design knowledge into an operational framework for institutional decision-making. Practically, it offers a structured approach for program leaders, studio coordinators, and quality-assurance teams who must determine how design-led work is staffed, reviewed, documented, and made accountable within higher education. This concern is consistent with institutional efforts to define architectural research more clearly and with the formal governance obligations attached to professional and educational bodies in architecture [6, 15]. The paper does not claim sector-wide generalizability; rather, it offers an analytically grounded framework intended to improve clarity, consistency, and decision quality in

the governance of studio-based inquiry.

CONCEPTUAL AND POLICY BACKGROUND

Research, teaching, and institutional coordination

European higher education reforms have reinforced the expectation that teaching and research should not be treated as isolated functions. In architecture, this has encouraged renewed reflection on how schools organize inquiry, practice, and curriculum as interdependent rather than separate domains. Recent discussions of architectural design research have stressed that the field is shaped by drivers emerging from both academic and professional practice, while broader reflections on the future of design research argue that its long-term development depends on clearer institutional conversations about what counts as knowledge, contribution, and rigor [1, 13]. For this reason, architectural design research cannot be managed effectively through inherited administrative categories alone; it requires a planning vocabulary capable of relating educational structures to disciplinary forms of inquiry. Introductory overviews of design research in architecture have been especially important in making that need visible by situating architectural inquiry within a wider methodological landscape [9].

In the architectural field, this tension has been particularly visible because architecture occupies a distinctive position between disciplinary autonomy and engagement with wider environmental, technological, and social conditions. That position complicates simplistic distinctions between theory and practice, academic research and professional production, or scientific method and creative experimentation. A managerial response is therefore needed that neither imposes inappropriate evaluation criteria nor leaves studio work governed only by informal custom.

Designerly ways of knowing and research by design

A significant body of scholarship has clarified that design possesses modes of knowing that differ from those of conventional scientific and humanities-based inquiry. These modes remain inquisitive, informed, methodical, and communicable, but they are often expressed through artifacts, images, models, and projective reasoning rather than through discursive argument alone. Design research has therefore been described as a disciplined conversation, while the relation between researching design and designing research has been used to show that inquiry in this domain must be understood through reflexive and practice-sensitive frameworks rather than borrowed methodological templates [4, 10]. In architecture, this has led to the maturation of research-by-design as a recognized approach.

Three features of that literature are especially relevant for management and planning. First, design is both medium and method: in design-led inquiry, the act of designing is not merely illustrative but integral to producing insight and organizing knowledge, a view strongly associated with arguments that this is precisely what research by design entails [12, 20]. Second, iteration is constitutive rather than incidental: reframing, staged testing, and movement between alternatives are not signs of methodological weakness but central mechanisms through which creative practice develops and inquiry proceeds [5, 16]. Third, communication remains essential: even when knowledge is generated through non-textual media, it must still be made discussable, traceable, and open to scrutiny, particularly when architectural projects become sites of controversy, negotiation, and contested interpretation [21].

From a planning perspective, these features matter because they imply that studio-based research requires a governance logic different from that of a conventional lecture course. It must be scheduled, documented,

and assessed as a sequence of evidence-bearing activities rather than as a single terminal deliverable. This argument also supports longstanding efforts to challenge simplistic myths about architectural research and to replace them with models that make practice-based inquiry more intelligible inside academic institutions [19].

Why the Design Studio is a management problem

If design-led inquiry is to remain credible in academic settings, the Design Studio must be more than a culturally valued teaching format. It must function as a managed environment in which educational aims, research processes, and institutional responsibilities are aligned. This includes the design of project briefs that support inquiry rather than only production, the coordination of staff with complementary disciplinary expertise, the allocation of time and resources for experimentation and documentation, the use of review procedures that can recognize non-textual forms of evidence, and the translation of studio outputs into formats that support accountability and public communication. In this respect, the Design Studio can be understood not simply as a room or pedagogical tradition, but as an organizational infrastructure through which architectural schools connect creativity, inquiry, and institutional responsibility.

The management challenge is therefore not to convert studio work into a conventional research laboratory, but to define planning principles that preserve disciplinary specificity while making studio-based inquiry governable.

MATERIALS AND METHODS

Research design

This study adopts a qualitative documentary analysis design. The primary documentary corpus is the advance-access version of Corbo's article on knowledge and inquiry in architectural design, cited in the reference list by its later 2026 issue assignment in the *Journal of Architecture and Urbanism*. That text was selected because it presents a coherent conceptual argument, explicitly identifies the Design Studio as the central locus of research in architectural education, and embeds multiple concrete examples that illustrate different studio-based modalities.

The article is treated not as a source of statistical data, but as a structured documentary case with sufficient internal differentiation to support analytical abstraction for management and planning purposes. This design is appropriate because the aim of the study is not to estimate prevalence or causal effects, but to convert a clearly articulated disciplinary argument into a more operational governance model while remaining close to the source evidence.

Units of analysis

Four documentary units were analyzed:

1. the article's policy framing of higher education, research, and academic reform;
2. the two central conceptual propositions: designerly ways of knowing, and research in/for/through/by design;
3. the eight explicit functions assigned to the Design Studio;

4. the five visual and pedagogical exemplars used to demonstrate those functions.

Table 1 summarizes the five documentary exemplars.

Table 1: Documentary exemplars analyzed in the study

Exemplar	**Educational context**	**Managerial relevance**
Manhattan's Geotaxonomies of the Fantastic (physical model)	PhD in Architecture by Design, Edinburgh School of Architecture and Landscape Architecture, 2022	Demonstrates doctoral-level design inquiry and the use of physical modeling as a structured knowledge device.
Virtual studio space	Studio Tom Emerson, ETH Zurich, 2020	Illustrates studio organization as a digitally mediated environment for collective inquiry and coordination.
Peeling logistics landscapes, scaffolding the banana industry (diagram)	Elective course *EXTERIORLESS. The Design of the Ordinary*, TU Delft, 2025	Shows how diagramming and mapping can support systems analysis, interdisciplinary integration, and comparative reasoning.
Learning landscapes (architectural visualization)	Graduation Studio, Group of Public Building, TU Delft, 2024	Demonstrates the managerial importance of representational innovation and the role of advanced media in design-led exploration.
Resilient prototypes (axonometric projections)	MSc. 2 Architectural Design Studio *Resilience-by-Design*, TU Delft, 2024	Highlights prototype-based collaboration, documentation, and the alignment of design experimentation with program-level themes.

All titles, project types, and institutional settings are taken from the documentary record.

Analytical procedure

The analysis proceeded in four linked stages.

First, the documentary text was coded for explicit statements about the purpose, structure, and outputs of studio-based research. Second, the eight studio functions identified in the corpus were grouped into planning categories relevant to governance, curriculum design, and review. Third, those categories were translated into a management framework intended for use at course, program, and institutional levels. Fourth, the provisional framework was checked against the five embedded exemplars to determine whether each dimension could be evidenced beyond a single conceptual passage and whether the dimensions remained analytically distinct across different studio formats.

The method is interpretive but systematic. A dimension was retained only when it was anchored in the documentary argument and could be meaningfully traced in the exemplars as a planning concern. This within-corpus validation does not establish external generalizability, but it improves analytical credibility by reducing dependence on an isolated quotation, a single image, or a single pedagogical case.

STUDIO PLANNING AND RESEARCH GOVERNANCE FRAMEWORK

The documentary analysis yields eight operational dimensions that define a research-capable studio. These dimensions are reorganized below as the *Studio Planning and Research Governance Framework* (SPRGF). Each dimension is directly grounded in the documentary record but expressed in management language. The dimensions were retained because they met two criteria within the corpus: each was explicitly supported by the source argument, and each could be located as a practical planning issue in one or more of the five exemplars.

Table 2: Studio Planning and Research Governance Framework (SPRGF)

Code	Planning dimension	Governance implication
P1	Research–teaching integration	Studio briefs, schedules, and assessments should explicitly combine learning objectives with knowledge-production aims.
P2	Iterative project sequencing	The studio calendar should be built around staged inquiry, scenario testing, interim reviews, and documented revision.
P3	Interdisciplinary coordination	Staffing, supervision, and review should bring together complementary expertise such as technology, environmental studies, theory, construction, and social analysis.
P4	Tools and media innovation	Budgeting, training, and infrastructure planning should support experimentation with emerging representational and analytical media.
P5	Knowledge codification	Project requirements should include taxonomies, repositories, comparison sets, inventories, or other formats that make learning and insight reusable.
P6	Civic interface and stakeholder engagement	Studio management should create pathways for public review, controversy mapping, stakeholder inclusion, and socially legible outputs.
P7	Multi-scalar relevance alignment	Topic selection and evaluation should test a project's relevance at personal, disciplinary, and societal levels.
P8	Practice–research integration	The studio should be governed as a site where making, reflection, and inquiry are co-constitutive, not sequentially separated.

The eight dimensions translate the documentary text's explicit statements about what the Design Studio does when it functions as a research environment.

Planning logic of the framework

The framework is designed to support three linked layers of decision-making and to make studio governance more explicit without substituting generic administrative metrics for disciplinary judgment.

At the **course level**, it helps coordinators plan briefs, milestones, deliverables, and review formats. At the **program level**, it supports alignment across studios, identifies staffing needs, and clarifies how design-led inquiry contributes to broader educational aims. At the **institutional level**, it provides a basis for quality assurance, reporting, accreditation narratives, and strategic positioning.

The practical value of the framework lies in its ability to convert a conceptual account of studio-based research into a set of operational planning questions:

- Is the studio structured as an inquiry process rather than only as a production exercise?
- Are the right forms of expertise available to support the stated ambitions of the brief?
- Do the required outputs produce reusable knowledge, not only project completion?
- Are the results legible to audiences beyond the immediate studio?

Read against the five exemplars, these questions function as a limited validation screen: they reveal recurrent governance requirements across doctoral, master's, graduation, and digitally mediated studio formats while still allowing the cases to differ in medium, scale, and pedagogical emphasis.

Annual review cycle

To support implementation, the framework can be embedded in an annual planning and review cycle, formalized in Algorithm 1. The algorithm does not replace academic judgment; rather, it offers a repeatable administrative routine for documenting how that judgment is exercised across a portfolio of studios.

Algorithm 1 Annual studio planning and review cycle

Require: Program portfolio of studio courses
Ensure: Annual planning decisions for curriculum, staffing, resources, and quality assurance
for each studio in the annual portfolio **do**
    Review the project brief and identify the intended research question or inquiry focus
    Map the studio against dimensions P1–P8
    Verify whether milestones include iteration, interim review, and process documentation
    Check whether supervision covers the required disciplinary competencies
    Confirm whether outputs include reusable forms of knowledge codification
    Assess whether stakeholder engagement or public-facing communication is planned
    Record resource implications (software, fabrication, review panels, external input)
end for
Compare studios across the portfolio to identify duplication, gaps, and opportunities for sequencing
Adjust staffing, facilities, and assessment criteria for the next cycle
Archive documentation for accreditation, reporting, and institutional learning

DOCUMENTARY FINDINGS

The studio as a managed research environment

The documentary evidence consistently presents the Design Studio not as a single event, but as a structured environment in which multiple academic functions intersect. This pattern is visible across the conceptual argument and is reinforced, rather than contradicted, by the five exemplars. The point has direct managerial significance: a research-capable studio requires intentional coordination of time, supervision, documentation, and review; it cannot be sustained through informal culture alone.

The first finding is therefore that the Design Studio should be planned as **infrastructure**. In the documentary record, the studio is described as the place where teaching, research, and learning blend to generate meaningful forms of knowledge. From a management perspective, this means that the studio must be recognized as a durable organizational unit: one that requires defined objectives, allocated resources, and auditable processes.

The second finding is that **iteration is a scheduling principle**. The documentary account repeatedly emphasizes staged exploration, design hypotheses, scenario building, and ongoing assessment. This suggests that effective studio planning depends on designing for sequence. A studio that compresses inquiry into a single final review or treats iteration as optional undermines the very process that makes research-by-design possible.

The third finding is that **documentation converts design activity into institutional knowledge**. The documentary text makes clear that design processes become legible when students are required to record

analysis, experimentation, and making. For management purposes, this implies that documentation is not ancillary. It is the mechanism that transforms individual studio effort into a reusable body of evidence for assessment, curriculum improvement, and program memory.

A second-pass comparison across the five exemplars provides a limited robustness check for these claims. The cases differ in level, medium, and institutional setting, yet each activates a recognizable subset of the same governance concerns: sequencing, documentation, expertise, communication, and alignment with broader academic aims. This does not amount to external validation, but it indicates that the framework is not dependent on a single isolated example or a narrowly idiosyncratic studio format.

Managerial significance of the five exemplars

The five exemplars documented in the corpus illustrate distinct but complementary planning lessons, and together they show how the framework travels across different educational levels and modes of practice.

Manhattan's Geotaxonomies of the Fantastic. This doctoral physical model demonstrates how design artifacts can function as research outputs in advanced academic settings. Its managerial importance lies in showing that doctoral design work requires evaluation criteria that recognize modeling, classification, and speculative formal reasoning as legitimate knowledge practices. Program planning at this level should therefore avoid text-only evaluation models and should make explicit provision for documentation that renders non-textual inquiry reviewable.

Virtual studio space. The ETH Zurich example shows that studio organization itself can be a research medium. A virtual or digitally mediated environment changes how critique, collaboration, and documentation are structured. This has implications for platform selection, review design, archiving practices, and staff coordination, particularly in distributed or hybrid learning contexts. In validation terms, the case confirms that the framework remains relevant even when the studio is defined by its interactional architecture rather than by a physical site.

Peeling logistics landscapes, scaffolding the banana industry. This diagrammatic case illustrates the value of systems thinking and comparative visual analysis. It is especially relevant for planning because it demonstrates how a studio can integrate environmental, technical, and socio-economic dimensions within a single project format. It supports the case for interdisciplinary staffing and for assignments that require analytical mapping, not only formal proposals. The case is particularly useful for testing the framework's ability to capture research-oriented work that is explicitly analytical and issue-driven.

Learning landscapes. This graduation-studio visualization highlights the role of emerging media in design-led inquiry. Its managerial lesson is that advanced representational work should be supported through training, technical infrastructure, and review criteria that distinguish between aesthetic polish and analytical value. Investment in new tools must therefore be paired with clear academic expectations. The case also reinforces the importance of separating evidentiary value from mere visual sophistication.

Resilient prototypes. This master's-level studio illustrates how prototyping can organize collective research on public-building and resilience themes. Its main planning value lies in showing how group work, iterative

testing, and documented projections can be aligned with program-level priorities. It also underscores the importance of linking studio themes to larger institutional agendas such as sustainability and public relevance. As a validation case, it confirms that the framework can accommodate collaborative and theme-driven studio formats without losing analytical coherence.

Table 3 translates these findings into management actions.

Table 3: Management actions derived from the documentary findings

Management domain	**Recommended action**
Curriculum design	Build studio briefs around explicit inquiry questions, staged milestones, and documented learning outputs.
Academic staffing	Match studio themes with interdisciplinary supervision rather than relying on single-specialism teaching.
Assessment design	Evaluate process evidence, codified knowledge, and communicability alongside final project quality.
Resource planning	Budget for digital platforms, fabrication tools, visualization software, and archiving infrastructure where relevant.
Quality assurance	Use documented iteration, review records, and portfolio evidence to demonstrate research capacity and educational integrity.
Public engagement	Require at least one outward-facing mode of communication, stakeholder review, or controversy-mapping component in socially oriented studios.
Program coherence	Sequence studios across the degree structure so that exploratory, analytical, and prototype-based formats support one another.

A workflow for institutional use

Figure 1 summarizes how the framework can be used in practice. It condenses the recurrent planning logic observed across the documentary corpus into a routine that is simple enough for administrative use but still anchored in the underlying pedagogical realities of studio-based inquiry.

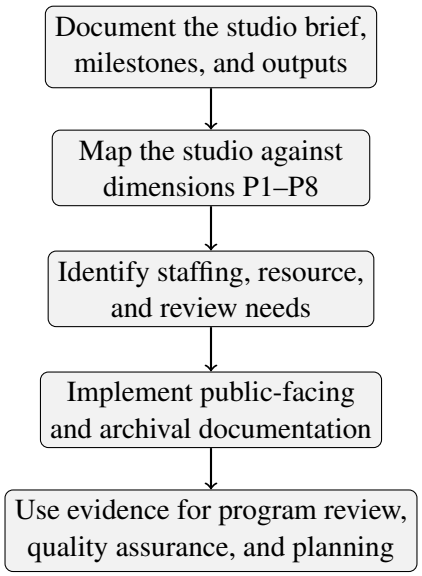

Figure 1: Institutional workflow for managing a studio as a research-capable learning environment.

IMPLICATIONS FOR MANAGEMENT AND PLANNING RESEARCH

Curriculum planning

The most immediate implication of the study concerns curriculum design. A research-capable studio cannot be planned as an isolated creative exercise. It requires explicit sequencing across the semester and across the degree structure. Introductory studios may emphasize observation and analysis; intermediate studios may prioritize codification and comparison; advanced studios may foreground prototyping, interdisciplinary integration, and public-facing communication. Planning at the program level should therefore treat studios as a coordinated inquiry pathway rather than a series of unrelated thematic projects. In practical terms, the framework encourages curriculum designers to align briefs, milestones, and review formats so that each studio contributes identifiable learning and research functions to the wider program.

Quality assurance and review

The second implication concerns quality assurance. In many institutions, design-led work is still evaluated through implicit norms, tutor preference, or the prestige of final representations. The framework proposed here offers a more transparent approach. It suggests that review systems should ask whether the studio generated documented iteration, reusable knowledge formats, interdisciplinary engagement, and socially legible outputs. Such criteria strengthen accountability without forcing design-led inquiry into metrics that ignore its actual modes of operation. By shifting attention from product prestige to evidentiary process, the framework can also improve the consistency and defensibility of review decisions across different tutors, cohorts, and studio themes.

Resource allocation and staffing

The third implication concerns resource planning. If institutions expect studios to function as sites of research and innovation, they must provide appropriate forms of support. This includes digital infrastructure, workshop or fabrication access, review time, interdisciplinary staffing, and systems for archiving and dissemination. The documentary evidence is clear that ambitious studio work often depends on more than the individual instructor's expertise. It requires an ecosystem of coordinated support. The framework therefore helps administrators justify resource requests by linking them directly to identifiable governance functions rather than to generalized claims about creativity or innovation.

Strategic positioning and public value

Finally, the study has implications for institutional strategy. Design schools and built-environment faculties increasingly need to demonstrate how their teaching contributes to research culture, public engagement, and societal relevance. The studio is well positioned to do this, but only if its outputs are structured to communicate beyond the internal review room. When managed effectively, studio-based inquiry can provide institutions with visible evidence of innovation, interdisciplinarity, and civic engagement. For that reason, the framework is best understood not only as an internal planning aid, but also as a way of making the public and strategic value of studio work easier to articulate in accreditation, reporting, and partnership contexts.

LIMITATIONS

This study is based on a single primary documentary text and should therefore be understood as a framework-building contribution rather than a generalizable sector-wide survey. Its strength lies in the clarity and internal coherence of the corpus, which makes it suitable for conceptual translation into a planning model. The added within-corpus validation step strengthens interpretive reliability by checking the framework against five differentiated exemplars, but it does not substitute for external testing across institutions, programs, or reviewer groups. The study therefore supports analytical clarification more than empirical generalization.

Future research should apply the framework across diverse studio-based programs, including architecture, urban design, landscape, and planning education. Comparative studies could examine whether the proposed dimensions are equally applicable in hybrid, online, or professionally embedded studio formats. Additional work could also test the framework's practical utility through multi-case evaluation, rubric development, and inter-reviewer comparison in real program-review settings.

CONCLUSION

The Design Studio can be understood not only as a pedagogical tradition, but as a managed environment for knowledge production. When viewed through the lens of management and planning, its value lies in the fact that it concentrates multiple institutional functions: teaching, research, experimentation, documentation, and public engagement. The central challenge is therefore organizational. If institutions want studio-based work to operate as research infrastructure, they must plan for it accordingly.

This paper has translated a documentary account of architectural research into a practical governance framework for higher education. By identifying eight planning dimensions, checking them against the documentary exemplars, and linking them to curriculum design, staffing, assessment, and quality assurance, it offers a structured way to manage design-led inquiry without stripping it of disciplinary specificity. The contribution is intentionally bounded: it does not claim universal applicability, but it does provide an analytically grounded, internally checked model that helps institutions make studio-based research more explicit, more reviewable, and more strategically valuable.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

DATA AVAILABILITY

The study is based on documentary analysis of publicly available scholarly sources and their embedded project examples. No human-subject data were collected.

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