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Institutional Seams and Cultural Sustainability in the Built Environment: The Case of Miyadaiku in Japan

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ABSTRACT:
Japan's miyadaiku tradition—temple and shrine carpentry—faces a transmission crisis despite official recognition as Important Intangible Cultural Property. Through practitioner interviews and email exchanges with officials from relevant ministries, this study argues that cultural transmission failure can arise not from insufficient value recognition but from institutional structures themselves. The concept of institutional seams is introduced: governance spaces where multiple authorities claim partial but legitimate jurisdiction while none accepts primary responsibility. Miyadaiku transmission falls into a seam spanning the Agency for Cultural Affairs, the Ministry of Education, the Ministry of Land, Infrastructure, Transport and Tourism (MLIT), and the Forestry Agency—each maintaining appropriate boundaries while collectively creating a coordination vacuum. Three defining characteristics—jurisdictional plurality, boundary ambiguity, and jurisdictional mutual delegation—enable identification of institutional seams before cultural transmission failures become irreversible. The study indicates that the erosion of craft-based knowledge systems constitutes not merely a cultural loss but a governance failure with direct consequences for sustainable timber heritage conservation and broader sustainability objectives. These findings have implications for integrating cultural sustainability into environmental assessment frameworks and contribute to SDG 11 (Sustainable Cities and Communities) and SDG 17 (Partnerships for the Goals).

Keywords: cultural sustainability; institutional seams; built environment; governance failure; miyadaiku; timber heritage; SDG 11

1. Introduction

Sustainability discourse in the built environment has advanced considerably in addressing material performance, energy efficiency, and carbon accounting, yet a critical dimension remains underexamined: the institutional conditions that enable or constrain the continuity of craft-based knowledge systems underpinning long-term architectural sustainability. Timber heritage conservation—and by extension the sustainability of repair-oriented construction practices—depends not only on the physical condition of structures but on the organizational capacity to train, certify, and deploy practitioners capable of their maintenance. This paper examines a case that makes this dependency visible with unusual clarity.

Japan's *miyadaiku* tradition—specialized skills for constructing wooden temples and shrines without metal fasteners—has a history spanning over 1,400 years. Kongō Gumi, Japan's oldest company, was founded in 578 as a group of *miyadaiku* and continues to operate today. However, this ancient tradition now faces a transmission crisis that is

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difficult to explain through conventional cultural protection logic. The tradition has received official recognition as Important Intangible Cultural Property under the Cultural Properties Protection Act. Nevertheless, master carpenters capable of transmitting the complete technical system—encompassing structural diagnostics, traditional joinery, timber selection, and multigenerational repair protocols—face severe and worsening constraints.

In recent years, timber heritage conservation has gained renewed attention in the context of sustainable architecture and low-carbon construction. However, while material performance and structural design strategies have been extensively studied, the institutional conditions that enable or constrain the continuity of craft-based systems remain insufficiently examined. This gap carries particular significance for global sustainability agendas, where SDG 11 explicitly calls for the integration of cultural heritage into sustainable urban development. It is consequential in a further practical sense: when the organizational infrastructure sustaining repair skills erodes, technically repairable heritage structures become operationally irreparable, regardless of the physical condition of their materials.

Traditional *miyadaiku* practices—including natural timber drying, zero-waste joinery, and multi-generational building durability—directly operationalize low-carbon construction principles. If natural air-drying were universally adopted for construction timber in Japan, it could reduce annual CO_2 emissions by approximately 0.5 megatons. This estimate is indicative and derived from existing governmental statistics and LCA-related studies on timber production and drying processes, rather than a full original life-cycle calculation conducted in this paper, and should be interpreted as illustrative of the order of magnitude rather than a precise projection. The institutional erosion of these practices thus carries environmental consequences that extend beyond cultural loss.

This paradox of simultaneous recognition and deterioration in a tradition over 1,400 years old suggests that cultural transmission failure can arise not from lack of value recognition but from institutional structures themselves. When official designation and operational decline coexist, the problem may lie not in insufficient acknowledgment of value but in the institutional capacity to translate recognition into practical, sustained support.

Through practitioner interviews conducted over four months and email exchanges with officials from two relevant ministries, this study introduces the concept of institutional seams: governance spaces where multiple authorities claim partial but legitimate jurisdiction while none accepts primary responsibility. This condition generates governance vacancies that are structural rather than incidental—resistant to resolution through conventional coordination measures alone. *Miyadaiku* transmission falls into a seam spanning the Agency for Cultural Affairs, the Ministry of Education, Culture, Sports, Science and Technology (MEXT), MLIT, and the Forestry Agency—each maintaining appropriate boundaries while collectively creating a coordination vacuum.

Institutional seams differ from established concepts in institutional theory. Institutional voids are characterized by absence of relevant authority (Khanna & Palepu, 2010), but the *miyadaiku* case presents an excess of partial authorities. Institutional overlaps feature competing claims to the same jurisdiction (Ansell & Gash, 2008), but here authorities claim adjacent but non-competing jurisdictions. By presenting three characteristics—jurisdictional plurality, boundary ambiguity, and jurisdictional mutual delegation—this

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study provides an analytical lens for detecting institutional seams before cultural transmission failures become irreversible. The analysis draws on Scott's (2014) three institutional pillars to demonstrate how seam structures simultaneously undermine regulatory, normative, and cognitive forms of institutional support. This study contributes to timber heritage conservation by demonstrating how institutional fragmentation undermines the continuity of craft-based building systems, and to sustainability governance by positioning cultural transmission as an institutional prerequisite for long-term material sustainability.

2. Literature Review

2.1 Heritage Governance

Heritage governance scholarship has established that effective conservation of built and intangible heritage depends not only on legal designation but on the operational capacity of governing institutions to translate recognition into sustained support (Smith, 2006; Kurin, 2004). In the context of architectural heritage, UNESCO's frameworks and national designation systems provide the normative foundation for protection, yet implementation consistently reveals gaps between formal status and functional maintenance infrastructure (Aikawa-Faure, 2009). Vecco (2010) and Blake (2000) have documented how insufficient legal operationalization and resource allocation undermine designated heritage even where value recognition is unambiguous and stakeholder commitment is present.

For timber heritage specifically, conservation depends on an integrated chain of enabling conditions: material supply continuity, craft skill transmission, regulatory compatibility with traditional methods, and institutional coordination across administrative domains. When these conditions are distributed across multiple ministries or agencies without an integrating governance mechanism, conservation frameworks may become structurally incapable of sustaining the very systems they nominally protect—regardless of the resources nominally allocated to their support. However, existing scholarship has paid limited attention to how institutional fragmentation specifically affects the transmission of craft-based knowledge systems that underpin timber architectural heritage.

2.2 Institutional Fragmentation

Institutional theory identifies two canonical pathologies in multi-authority governance contexts: institutional voids, characterized by absence of relevant authority (Mair & Martí, 2009; Khanna & Palepu, 2010), and institutional overlaps, where competing claims to the same jurisdiction produce conflict and implementation paralysis (Ansell & Gash, 2008). Neither framework captures the pattern examined here: multiple authorities each claiming partial and legitimate jurisdiction while collectively producing a coordination vacuum in which comprehensive responsibility is held by no one.

Peters (2015) and Pollitt (2003) address cross-sectoral coordination failures within joined-up government frameworks, but their analyses assume that authorities at least recognize the need for coordination and attempt to establish it. In institutional seams, by contrast, each authority appropriately maintains its own legitimate boundaries without accepting responsibility for the governance gaps that result. This produces a paradox: individually

well-intentioned boundary-setting collectively generates structural governance failure through the cumulative effect of rational jurisdictional decisions.

2.3 Cultural Transmission and Sustainability

Cultural transmission research has documented that intangible heritage erosion typically results from resource shortage, inadequate legal protection, or lack of community engagement (Blake, 2000; Kurin, 2007). These explanations do not, however, account for transmission failure when official recognition, committed practitioners, and broad societal acknowledgment of cultural importance coexist—precisely the configuration observed in the *miyadaiku* case.

Kirshenblatt-Gimblett (2004) shows how cultural property designation can reframe living practices as metacultural representation, disconnecting them from their primary economic and functional context. The present study extends this insight by demonstrating that fragmented jurisdictions structurally prevent recognition from translating into operational support—producing deterioration not despite institutional engagement but because of the particular form that engagement takes when responsibility is distributed without coordination. Crucially, for the built environment, the erosion of craft-based knowledge systems does not merely represent cultural loss: it constitutes the progressive dismantlement of the technical infrastructure necessary for repair-oriented, low-carbon construction practices that contemporary sustainability frameworks nominally seek to promote.

3. Research Methods

This study employs an exploratory case study design combining practitioner interviews, email exchanges with officials from relevant ministries, and policy document analysis (Yin, 2018; Eisenhardt, 1989). Case study methodology enables the examination of how complex institutional dynamics unfold in practical contexts, capturing patterns of behavior and avoidance that would be invisible to survey or aggregate data approaches.

3.1 Practitioner Engagement (June–October 2025)

Participants were categorized into two groups: VC (voluntary carpenters association and independent practitioners) and SC (corporate and organizational actors involved in *miyadaiku* practice and training). Four practitioners were engaged across five separate engagements over a four-month period, spanning individual carpenter, corporate, and industry association levels. Subjects are identified by role-based codes to preserve anonymity.

Participant recruitment followed a purposive, theoretically-informed sampling strategy (Eisenhardt, 1989; Gioia et al., 2013). Rather than seeking numerical breadth, recruitment prioritized institutional positioning: the study required participants who could speak from direct experience of the governance structures under examination. Initial contact was made with sector-level networks, including a national voluntary carpenters association (leading to VC-001 and, via referral, VC-002) and organizational actors with direct engagement in *miyadaiku* training and construction (leading to SC-001 and SC-002). The four participants collectively span individual craftsperson, corporate, industry association, and NPO

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perspectives, providing cross-institutional triangulation appropriate to the research question.

VC-001 (President, voluntary carpenters association) was interviewed online on June 17, 2025. VC-002 (Skilled carpenter and national plane competition champion, Niigata Prefecture) was interviewed online on August 28, 2025. SC-001 (Master carpenter, company CEO, and representative director of an NPO for traditional wooden architecture preservation) was interviewed face-to-face at the company headquarters in Isehara City on September 19, 2025. SC-002 (Executive director of a *miyadaiku* construction company and executive director of an NPO for *miyadaiku* training) participated in three engagements between September and October 2025, including participant observation at the Haneda Grand Tea Ceremony on October 16, 2025.

Interviews followed a semi-structured protocol covering: (1) daily challenges in *miyadaiku* practice and training; (2) interactions with relevant governmental bodies; (3) perceived institutional barriers to training infrastructure; and (4) practitioners' assessments of the causes of skill transmission difficulty. Analysis followed thematic analysis procedures (Braun & Clarke, 2006), producing 47 first-order codes subsequently grouped into higher-order themes. Coding was conducted by the lead researcher with analytical memos ensuring auditability.

The lead researcher's positionality warrants acknowledgment. Background includes professional experience in construction-related regulatory contexts and academic work on institutional analysis of governance systems, which may have predisposed attention toward governance explanations. This risk was managed by explicitly inviting participants to discuss economic and social factors and by systematically documenting complicating evidence.

3.2 Theoretical Saturation and Sample Adequacy

The small practitioner sample (N=4) reflects the study's theory-building orientation. Saturation was assessed through analytical saturation (convergence of characteristics across participants without new characteristics emerging in later engagements) and theoretical saturation (the framework's capacity to account for governance dynamics across all four accounts). Negative cases—instances of effective ministerial coordination—were actively solicited; none were identified. Systematic verification across a broader practitioner population constitutes a priority for future research.

3.3 Email Exchanges with Ministry Officials (November 2025)

Forestry Agency officials provided substantive written responses to six questions regarding cultural considerations in timber utilization policy and high-quality timber supply for cultural property maintenance (November–December 2025). MLIT officials confirmed receipt of seven questions on November 13, 2025, but provided no substantive response over three weeks despite follow-up inquiries. The absence of a response from MLIT is acknowledged as a limitation: non-response cannot serve as affirmative evidence of institutional ambiguity or delegation. It is noted as a contextual observation that prevented full triangulation of MLIT's jurisdictional position.

3.4 Policy Document Analysis

Major legal frameworks were reviewed: the Cultural Properties Protection Act, the Building Standards Act, the Forest Act, and the School Education Act, together with ministerial annual reports and policy guidelines clarifying formal jurisdictional boundaries.

3.5 Analytical Approach and Validity

Analysis proceeded through three stages: mapping jurisdictional structures via legal documents and ministry email exchanges; identifying avoidance patterns through systematic coding; and assessing institutional effects across Scott's (2014) three pillars. The institutional seam concept was iteratively refined following Gioia et al. (2013). Multiple data sources enable triangulation of findings across administrative domains.

4. Findings

4.1 Institutional Seam Across Four Governmental Authorities

Miyadaiku cultural transmission sits at the intersection of four distinct governmental authorities, each holding legitimate but partial authority. For precision: MEXT and MLIT are full ministries, while the Agency for Cultural Affairs is an external agency of MEXT and the Forestry Agency is an external agency of the Ministry of Agriculture, Forestry and Fisheries; all four are treated here as governmental authorities in recognition of their operationally autonomous jurisdictional mandates. The Agency for Cultural Affairs designates *miyadaiku* as Important Intangible Cultural Property under the Cultural Properties Protection Act but holds no authority over training systems, practitioner certification, or construction regulation. MEXT governs vocational education but currently provides no programs for specialized craft skills classified as cultural properties. MLIT regulates construction but does not actively mandate preservation of traditional construction methods. The Forestry Agency manages timber resources but defines sustainability through industrial supply indicators, with no special treatment for high-quality timber needed for shrine and temple construction and repair.

This configuration exhibits three institutional seam characteristics: (1) Plurality—four governmental authorities each hold relevant and legitimate partial authority; (2) Ambiguity—the boundaries among 'cultural property,' 'vocational training,' 'construction regulation,' and 'forestry management' remain undefined for integrated cultural transmission; (3) Jurisdictional Mutual Delegation—each authority claims legitimately limited scope while delegating comprehensive responsibility to the other governmental authorities in a circular pattern that forecloses resolution.

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Figure 1: Institutional Seam in Miyadaiku Cultural Transmission

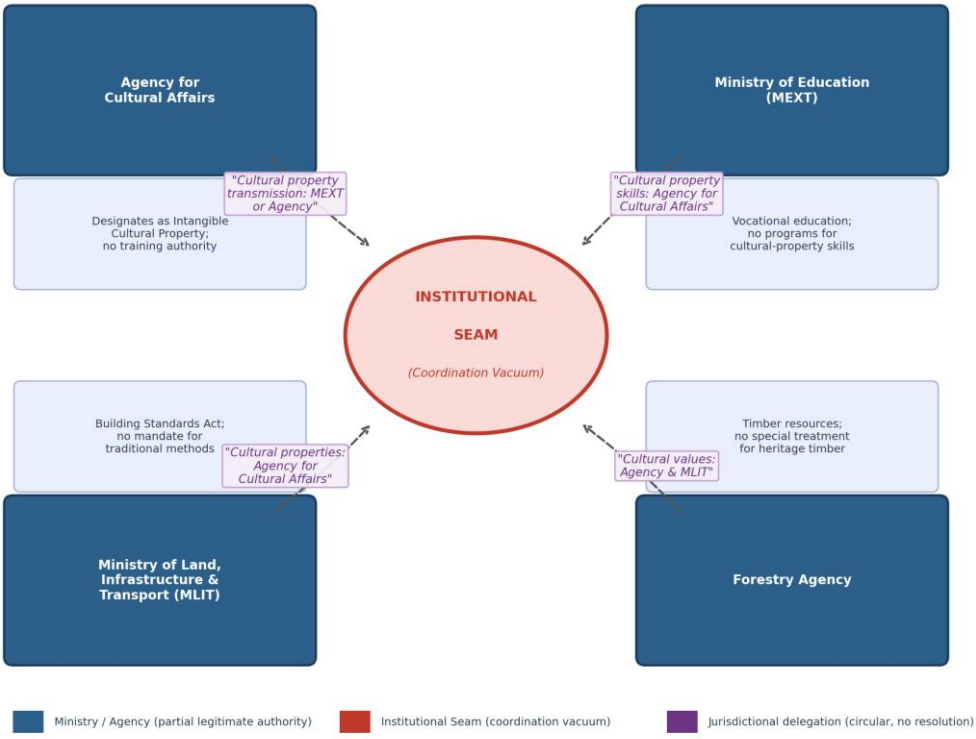

Figure 1: Institutional Seam in Miyadaiku Cultural Transmission. Dashed arrows indicate the circular pattern of jurisdictional mutual delegation. The coordination vacuum at the centre is an emergent structural property of individually appropriate boundary decisions.

4.2 Jurisdictional Plurality

The Forestry Agency's email response exemplified how each authority claims partial authority on individually defensible grounds while simultaneously foreclosing comprehensive responsibility:

"From the perspective of sustainable utilization of forest resources, promotion of timber use is an important policy for our agency. However, judgments of value as cultural properties and transmission of traditional skills fall under the jurisdiction of the Agency for Cultural Affairs." (Forestry Agency official, November 2025)

This response is coherent within the Forestry Agency's mandate but structurally forecloses its involvement in the integrated challenge of high-quality timber supply for *miyadaiku* training. SC-001 articulated the operational consequence:

"To properly restore historic shrines and temples requires the highest quality timber. However, the supply system for such timber is nobody's responsibility. The Forestry Agency considers industrial timber supply, the Agency for Cultural Affairs considers protection of existing cultural properties. The timber supply system for training new miyadaiku falls between them." (SC-001, September 2025)

4.3 Boundary Ambiguity

Boundary ambiguity emerges from the way the four administrative domains—cultural property, vocational training, construction regulation, and timber supply—are institutionally separated despite being functionally inseparable for *miyadaiku* transmission. Each authority's administrative logic treats its domain as analytically bounded; the practice of *miyadaiku* transmission requires their integration.

"To become a miyadaiku, you have to become an apprentice. However, neither MEXT's vocational training system nor the Agency for Cultural Affairs' cultural property protection system has systematic training programs for miyadaiku." (VC-002, August 2025)

The three-week absence of substantive response from MLIT prevented full triangulation of MLIT's jurisdictional position from direct governmental evidence—a recognized limitation. The characterization of MLIT's role draws primarily on policy document analysis and practitioner accounts rather than direct ministerial correspondence.

4.4 Jurisdictional Mutual Delegation

The most structurally significant finding is the circular pattern in which each authority claims legitimately limited jurisdiction while delegating comprehensive responsibility to the others. No authority is evasive within its own domain; the governance failure emerges from the aggregate of individually appropriate responses.

"When we seek training support from the Agency for Cultural Affairs, they say 'vocational training is MEXT.' When we go to MEXT, they say 'cultural property designated skills are the Agency for Cultural Affairs.' When we seek building code exceptions from MLIT, they say 'cultural properties are the Agency for Cultural Affairs.' When we seek high-quality timber procurement from the Forestry Agency, they say 'cultural property uses are the Agency for Cultural Affairs and MLIT.' Everyone is saying correct things. But nobody can provide the comprehensive support we need." (SC-002, October 2025)

This circular delegation structure is not a product of organizational negligence. Each authority's boundary-setting reflects genuine and appropriate jurisdictional limitation. The governance failure is emergent: it arises from the interaction of correct decisions within an institutional architecture that assigns no authority responsibility for coordinating accountability for integrated outcomes.

4.5 Simultaneous Erosion of Three Institutional Supports

The institutional seam simultaneously erodes all three of Scott's (2014) institutional pillars. Regulatory support is fragmented: no authority holds primary accountability for an integrated training and certification system. SC-001 summarized the regulatory consequence: "Everything falls outside normal systems on grounds that 'it's special because it's cultural property.'" (SC-001, September 2025).

Normative support is undermined by contradiction between official recognition and operational absence. VC-001: "The government says 'traditional skills are important.' But when young people try to become carpenters, only precut factory jobs are available." (VC-001, June 2025). Young practitioners receive official signals of cultural importance while facing practical conditions that make sustained investment in *miyadaiku* apprenticeship economically irrational.

Cognitive support is absent because no authority possesses categories that capture the integrated reality of *miyadaiku* transmission as a system. SC-002: "There is no ministry with

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that integrated perspective, nor any ministry providing comprehensive support." (SC-002, October 2025). The Haneda Grand Tea Ceremony participant observation corroborated this: practitioners across sectors expressed shared bewilderment at the difficulty of obtaining coordinated governmental response.

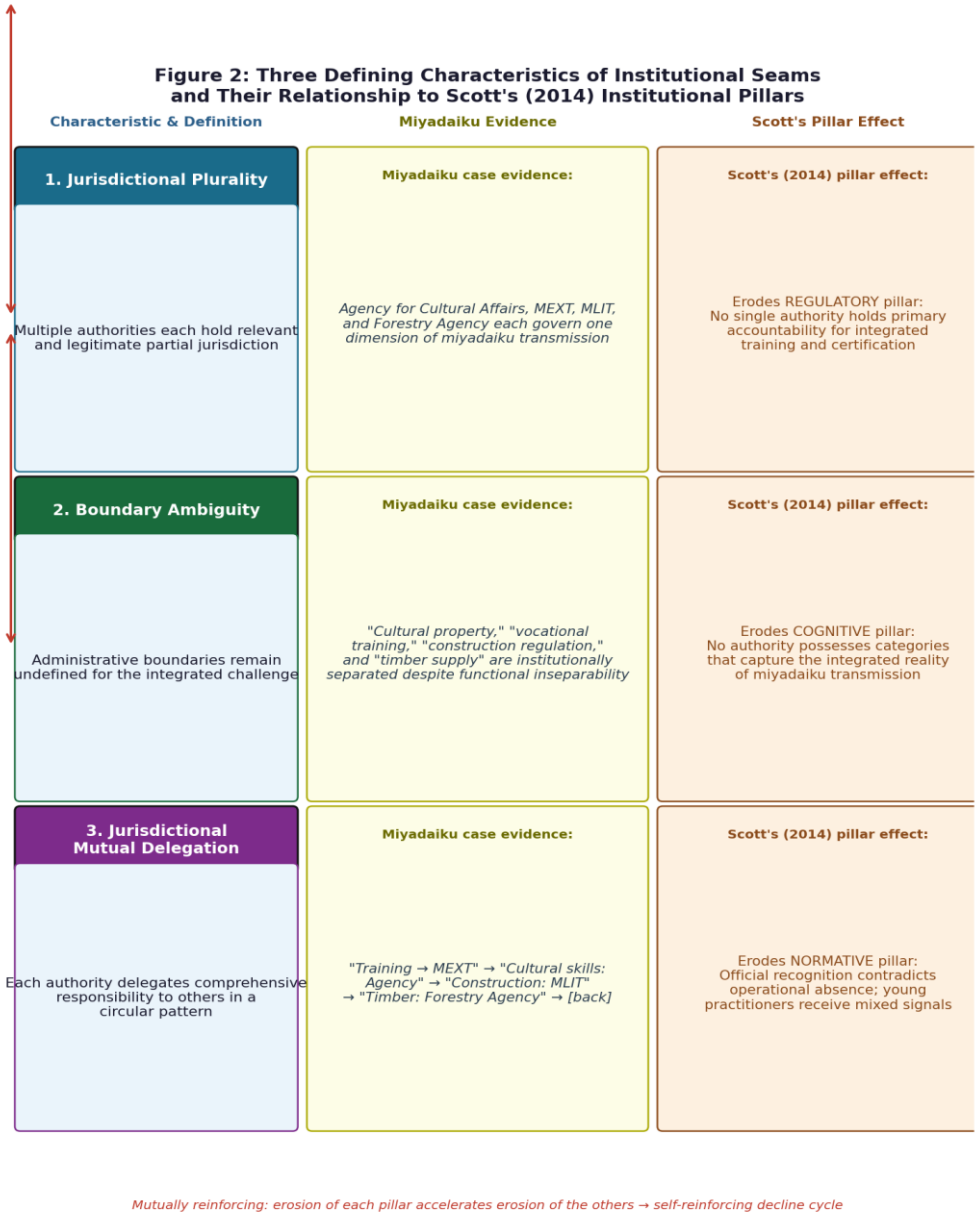

Figure 2: Three Defining Characteristics of Institutional Seams and Their Relationship to Scott's (2014) Institutional Pillars. Each characteristic erodes a distinct pillar of institutional support; the three erosion processes are mutually reinforcing, producing a self-sustaining decline cycle.

The erosion of all three pillars is mutually reinforcing, producing a self-reinforcing decline cycle in which institutional seam structure—rather than resource shortage or lack of cultural valuation—is the primary structural mechanism identified by this study, though causal primacy relative to economic and demographic factors cannot be conclusively established from the available evidence. Apprentices who enter the *miyadaiku* pathway face a decade or more of training without the regulatory protections, normative incentives, or cognitive recognition that accompany equivalent investment in standard construction vocational pathways.

5. Discussion

5.1 Theoretical Implications

This study identifies a third institutional pathology distinct from the two categories established in existing literature. Khanna and Palepu's (2010) institutional voids are characterized by absence of relevant authority; institutional seams, by contrast, are characterized by an excess of partial authorities whose individual legitimacy collectively produces vacancy. Ansell and Gash's (2008) institutional overlaps involve competing claims to the same jurisdiction, producing conflict resolvable in principle through boundary clarification; institutional seams involve adjacent but non-competing claims that collectively produce a coordination vacuum that no boundary clarification alone can resolve.

The paradox of institutional seams lies in their constituent rationality. Each authority's boundary-setting is correct within its administrative mandate; no single actor is responsible for the governance failure that results. This distinguishes seams from coordination failures (Peters, 2015; Pollitt, 2003), which assume authorities recognize the need for coordination. In institutional seams, authorities do not resist coordination—they simply have no mandate to pursue it.

To further specify the distinctiveness of the institutional seam concept, Table 1 compares it with the most closely related governance concepts along three analytical dimensions.

Table 1: Comparative typology of institutional governance pathologies.

Concept	Authority structure	Failure mechanism	Policy response
Institutional void (Khanna & Palepu, 2010)	Absence of relevant authority	No actor present to govern	Create relevant institutions
Institutional overlap (Ansell & Gash, 2008)	Competing authority over same domain	Conflict and paralysis	Clarify or consolidate authority
Coordination failure (Peters, 2015)	Multiple actors resist joint action	Political / cultural barriers	Build trust and incentives
Institutional seam (this study)	**Excess of partial, non-competing authority**	**Emergent vacancy from individually appropriate boundary decisions**	**Designate an integrating authority**

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The three-characteristic framework—plurality, ambiguity, mutual delegation—provides a diagnostic instrument applicable before transmission failures become irreversible. The concept also carries methodological implications: current heritage governance assessments focus on lagging outcome indicators—declining practitioner numbers, reduced maintenance frequency, deteriorating physical conditions. The three-characteristic framework offers a leading indicator, enabling governance diagnosis before consequences manifest in measurable conservation outcomes.

5.2 Competing Explanations and Scope of Institutional Effects

The *miyadaiku* transmission crisis could plausibly reflect economic factors—declining construction demand, low apprenticeship wages, or deteriorating returns on training investments—as well as demographic trends. The institutional seam analysis does not deny the salience of these factors. VC-001 explicitly noted that wage differentials make the *miyadaiku* pathway economically irrational for many prospective entrants. VC-002 corroborated this, identifying inadequate certification credentials as a compounding factor. However, the institutional seam analysis identifies a mechanism that operates independently of and in interaction with these economic and demographic factors. Wage structures and certification frameworks are themselves products of institutional design; their inability to sustain traditional skill investment is not exogenous to governance but is, in part, an institutional consequence. The absence of a *miyadaiku*-specific certification category is directly traceable to the jurisdictional structure documented in Section 4: no authority holds the integrated mandate necessary to create such a category. The institutional seam thus functions as a structural amplifier of economic and demographic pressures.

5.3 Implications for Sustainability Governance and the Built Environment

The *miyadaiku* case suggests that craft-based building systems require an intact institutional chain spanning material supply, skill transmission, regulatory compatibility, and procurement infrastructure. When this chain is distributed across jurisdictions without coordinating accountability, conservation frameworks become structurally incapable of sustaining what they nominally protect.

Contemporary building assessment frameworks—including LEED, CASBEE, and BREEAM—evaluate environmental performance primarily through material efficiency, energy consumption, and carbon metrics, while treating cultural practices and craft knowledge as secondary or symbolic attributes. The *miyadaiku* case challenges this framing: if the institutional conditions sustaining repair-oriented craft systems erode, structures that would otherwise remain serviceable for generations are progressively redirected toward replacement pathways, multiplying embodied carbon impacts over time.

This study proposes three categories of institutional transmission indicators for integration into heritage building sustainability assessments. First, governance structure indicators: whether the full transmission chain is governed by a designated coordinating authority or distributed across jurisdictions without integrating mechanism; measurable through documentary analysis of legislative mandates. Second, practitioner pipeline indicators: the ratio of active master-level practitioners to designated heritage structures, apprenticeship intake rates relative to attrition, and the existence of recognized credential categories.

Third, material supply continuity indicators: the availability and stability of procurement pathways for heritage-grade materials; measurable through supply chain surveys.
Standard conservation interventions are insufficient when institutional seams exist: increasing funding within existing administrative categories deposits resources into a fragmented institutional environment where their coordinated deployment is architecturally impossible. Effective intervention requires addressing the seam structure directly through: designating a lead coordination authority accountable for the full transmission chain; establishing cross-ministerial frameworks with explicit shared responsibility; or repositioning integrated craft transmission within a consolidated ministerial jurisdiction.

5.4 Generalizability and Limitations

The institutional seam concept extends beyond Japanese timber heritage to any governance context where multiple specialized agencies must coordinate across ambiguous boundaries without designated integrating authority. The criteria are transferable across administrative systems and policy domains precisely because they identify structural features—plurality, ambiguity, mutual delegation—rather than culturally specific content.
This study carries acknowledged limitations. The small practitioner sample (N=4) limits statistical generalizability. The *miyadaiku* case represents a historically and institutionally specific configuration; systematic cross-cultural validation across other craft-based building traditions remains a priority for future research. The applicability of the institutional seam framework to other governance domains is proposed as a plausible extension based on structural analogies, not as an empirically demonstrated finding, and requires domain-specific validation.

6. Conclusion

This study introduced the concept of institutional seams: governance spaces where multiple authorities claim partial but legitimate jurisdiction while none accepts primary responsibility. Drawing on the case of *miyadaiku* transmission in Japan, the analysis indicates that failures in timber heritage conservation can arise not from insufficient value recognition but from the institutional architecture within which recognition is embedded. Three defining characteristics—jurisdictional plurality, boundary ambiguity, and jurisdictional mutual delegation—provide an analytical lens for detecting institutional seams before conservation failures become irreversible. The fragmentation documented across four Japanese governmental authorities simultaneously erodes regulatory, normative, and cognitive institutional support, converting a technically maintainable craft-based building system into a progressively unsustainable one through individually appropriate actions that collectively produce structural governance failure.
The empirical findings are limited to the Japanese *miyadaiku* case. The following broader claims are proposed as theoretically grounded hypotheses for future investigation: that institutional seam structures may exist in other craft-based heritage systems; that the proposed transmission indicators may provide predictive value; and that the framework

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may have diagnostic utility in governance domains beyond heritage conservation—each requiring domain-specific validation before practical application.

Institutional fragmentation emerges not as an administrative inconvenience, but as a structural risk factor that directly conditions the feasibility of conservation itself. Future sustainability frameworks may benefit from explicitly integrating institutional continuity into their evaluative criteria, recognizing that the preservation of built heritage depends not only on physical artifacts but on the sustained reproduction of the knowledge systems that make their maintenance possible.

Future research should proceed in three directions: empirical verification of institutional seams in comparable craft-based building traditions; systematic evaluation of coordination mechanisms capable of bridging seam structures; and quantitative modeling of conservation outcomes under contrasting governance configurations. For policymakers, sustainability strategies must extend beyond technical standards to include institutional design capable of sustaining knowledge systems over time.

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