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Fragmented Oem/Odm Production Networks As A Structural Failure: A Systems-Level Analysis

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Abstract
Cross-border B2B contract manufacturing in product categories with multi-component design, biological raw-material variability and seasonal calendars is conventionally organized as a chain of independent contractors. Designers, pattern engineers, factories and hardware vendors sit upstream; inspection firms, freight forwarders and customs brokers sit downstream, each accountable for one segment of the lifecycle. The OEM/ODM contract chain aligns with global value chain literature on modular contracting, but it generates structural failures resistant to incremental fixes. The paper is grounded in the author's long-term operational practice and draws on conceptual analysis rather than statistical methods, with the Guangzhou bags and leather goods cluster as the working setting; no quantitative data are presented. Four compounding failure modes are identified: information loss at handovers, accountability dispersion across contractual boundaries, quality erosion through cumulative material substitution, and calendar-cost compression that converts upstream variability into downstream cost. They share a common origin: the buyer is asked to perform an architectural integration role for which the buyer holds neither cluster-side production information nor operational reach over the supplier configuration. Point improvements such as tighter specifications, more inspections, on-site agents and longer contracts change the magnitude of specific failure modes without changing the architecture that generates them. The paper locates the structural problem in the misallocation of architectural authority, frames it within transaction-cost economics and global value chain governance, identifies the conditions under which fragmentation remains appropriate, and states the falsification conditions for each failure mode.

Keywords accountability dispersion, architectural authority, contract manufacturing, cross-border production, fragmentation, global value chains, information loss, leather goods industry, OEM model, quality erosion, structural failure, transaction cost economics.

INTRODUCTION

A cross-border B2B order for bags and leather goods passes through more hands than its buyer typically realizes. The work begins with an industrial designer and a pattern engineer, moves into one or more cutting and assembly factories supported by hardware and lining vendors, and exits through an independent inspection firm before reaching a freight forwarder and a customs broker. Each party is contracted separately and is accountable for a defined segment. None is accountable for what the buyer is actually purchasing: a coherent collection that arrives in the destination market in form, on cost and on

calendar.

This is the fragmented OEM/ODM model. It is the standard organizational form of cross-border contract manufacturing in this industry, it has been intensively studied at the level of value chain configuration [1, 2, 3], and it can be read economically as a transaction-cost configuration in which lateral coordination economizes on hierarchical authority while shifting the synchronization work to the buyer [4, 5]. For products that are simple, for orders that are infrequent, for buyers that have surplus integration capacity in-house, the fragmented model is efficient. For repeated cross-border collections in bags and leather goods, with seasonal calendars, multi-component products, raw-material variability, and cultural distance between production and consumer market, the fragmented model generates a recognizable family of structural failures that have proved resistant to point fixes.

This paper is the depth treatment of those failures. The author's operational practice has also informed the development of an integrated architectural alternative discussed separately in companion work. The present paper, however, develops the diagnosis on its own terms: it specifies the structural problem that any alternative would have to address, without advocating a particular solution, in terms general enough that the reader can decide whether the conditions that motivate the diagnosis apply to a given situation.

The paper traces four failure modes that recur in this configuration: information loss at handovers, accountability dispersion across contractual boundaries, quality erosion through cumulative material substitution, and calendar-cost compression. Having shown why they compound, the analysis turns to the typical repertoire of point improvements and explains why none of them dissolves the underlying configuration. The structural locus is then identified in the buyer's misallocated architectural role and in the transaction-cost logic that produces the misallocation. A short closing section sets out the conditions under which the fragmented chain nevertheless remains an appropriate architecture.

The analytical method is a literature synthesis cross-referenced with the author's practitioner observation in the Guangzhou bags and leather goods cluster over years of continuous operational practice. The supplier types referenced (cutting and assembly factories, hardware and lining vendors, independent inspection firms, freight and customs handlers) reflect the supplier configuration the author has worked with directly; supplier identities are not disclosed and no quantitative data are reported. The vignettes that appear below are practitioner-anchored illustrations of architectural configurations rather than evidence in the statistical sense. The argument should be read as a conceptual paper that uses cluster-side observation to discipline its abstractions, not as fieldwork.

THE FRAGMENTED OEM CHAIN AND ITS ECONOMIC LOGIC

The fragmented OEM chain is a sequence of arms-length contracts. Each contract specifies a defined deliverable for a defined fee, with explicit performance criteria for the segment in question and silent presumption of integration at the segment's edges. The buyer is the only party in the chain that holds the integrated commercial intent. The buyer is also the only party expected to absorb integration failure when it occurs.

The economic logic of the chain is the transaction-cost logic that Coase [1] originated with his question of why firms exist at all and that Williamson [4, 5] developed into the make-versus-buy framework. Lateral contracting between specialized parties economizes on hierarchical authority and on the cost of carrying integrated capacity in-house. Williamson [2] later sharpened the formulation. He distinguished strategizing, the search for advantageous market positions, from economizing, the search for governance forms that minimize transaction cost. The sustainability of a chain configuration, he argued, depends on the latter rather than the former. Where the parties are specialized enough that the gains from specialization exceed the

coordination costs of contracting, the chain is efficient. When coordination costs swallow specialization gains, the buyer pays for the integration twice — once in supplier margins, once in rework. The cross-border bags-and-leather-goods setting is structurally on the inefficient side of this trade-off, for four reasons documented in the GVC governance literature [1, 3, 8].

Tight technical interfaces. Pattern decisions interact with material grade, hardware decisions interact with edge treatment, packaging decisions interact with freight cost. Brusoni, Prencipe and Pavitt [3] characterized this configuration as knowledge specialization under organizational coupling: the segments cannot be cleanly separated, and integration costs do not vanish when the segments are contracted separately, because the coupling between segments demands an integrating actor that knows more than any single segment makes.

Raw-material variability. Leather in particular is biologically variable, and the variability requires cluster-side judgment that cannot be specified contractually in advance. Rindfleisch and Heide [4], reviewing three decades of transaction-cost evidence, identified exactly this configuration (high asset specificity combined with high behavioral and environmental uncertainty) as the one in which arms-length contracting becomes structurally fragile.

Seasonal calendar compression. The time between concept and delivery is short, leaving little room for the iterative coordination that fragmented chains rely on.

Cross-cultural integration decisions. Cultural distance between production and consumer market introduces a class of integration decisions (palette, proportion, tactile finish, regulatory compliance) that no individual segment is equipped to make.

Sturgeon [5] and Sturgeon, Van Biesebroeck and Gereffi [6] showed that modular production networks are efficient where interfaces are clean, specifications travel well between firms, and the lead firm holds the architectural decisions internally. Where the interfaces are dirty and the lead firm (in this case, the buyer) does not hold the architectural decisions, the modular network reverts to fragmentation costs. Macher and Richman's [7] survey of empirical transaction-cost work confirms that the predicted alignment between governance form and exchange attributes holds across a wide range of industries; what varies across industries is the magnitude of the misalignment cost when the alignment fails. The bags-and-leather-goods cross-border setting is precisely the configuration in which the lead firm is structurally outside the cluster and the architectural decisions are unclaimed.

An economic asymmetry sits at the heart of this configuration. Each contractor in the chain captures a defined fee for a defined deliverable; the contractor's incentive is to optimise the deliverable. The buyer captures the integrated outcome, or its absence, but cannot operationally produce the integration. The chain therefore concentrates the upside of specialization at the contractor level and the downside of integration failure at the buyer level. Williamson's [8] account of vertical integration is the abstract framing of this asymmetry: where the integration externalities are large enough that distributed contractors cannot internalize them, the make-versus-buy decision tips towards integration. Holcomb and Hitt [9] extended the same logic to strategic outsourcing. Their argument is that the gains from delegating production to specialized suppliers depend on whether the buying firm retains the integrative knowledge that crosses supplier boundaries. Where that capability is absent, outsourcing transfers production cost downstream while leaving integration cost in place. In the cross-border B2B bags-and-leather-goods setting, the externalities are large enough; what is missing is the integrating actor that the framework presumes. The remaining sections trace what happens in that actor's absence.

FOUR STRUCTURAL FAILURE MODES

Four failure modes follow from the architectural unclaimed-ness. Table 1 names them and pairs each with its mechanism. The four are emergent properties of the chain rather than failings of any

participant; they reproduce themselves across cycles, across categories, and across geographies whenever the architectural conditions are present.

Table 1 — Four structural failure modes of fragmented contract manufacturing

Failure mode	Mechanism	Compounding effect
Information loss at handovers	Each handover introduces an interpretation step; cumulative drift between buyer intent and production parameters grows with chain length	Architectural decisions are taken on degraded information
Accountability dispersion	Each contractor accountable for one segment; no contractor accountable for the integrated outcome	Integration failure has no responsible party
Quality erosion	Initial reference sample replaced over time by progressively cheaper material grades; each substitution rational at the supplier level	Cumulative drift away from the agreed product
Calendar-cost compression	Upstream variability not absorbed early; cost and time consequences fall on the late phases of the lifecycle	Late corrections are expensive, on-time delivery becomes fragile

Information loss at handovers. A buyer's market intent is rarely structurally complete at the moment it is communicated; it is a partial description of a commercial expectation, encoded in the buyer's local information. Granovetter's [10] embeddedness argument captures the relevant property of that information: commercial intent is generated within a specific network of consumer-market expectations and supplier-market norms, and it cannot be fully decontextualized into a contractual document without losing the embedded layer that gives it its meaning. Each contractor in the chain interprets the description against its own segment's logic. For the designer it is an aesthetic brief; the pattern engineer treats the same document as a construction problem, the factory as a tooling and labour question, while for the freight forwarder it reduces to a set of packaging dimensions. Carlile [11] terms this kind of cross-domain reading a problem of pragmatic boundaries. Common knowledge is sufficient to receive a document but not to register the dependencies its contents create across specialized practices. Each interpretation introduces drift; each handover compounds the drift introduced by the previous one. Mayer and Argyres [12], studying contractual interactions in the personal-computer industry, showed that the communicative codes which would let buyers and suppliers transmit complex intent without drift are themselves slow to develop and depend on repeated interaction within stable dyads. In the fragmented OEM chain the dyads are reshuffled often enough that the codes never stabilize. By the time the cutting room receives the technical pack, the document in front of the cutter and the intent inside the buyer's head are not the same document. The drift is invisible at any single boundary and clearly visible only at the integrated outcome, by which point integration is no longer reversible.

Henderson and Clark [13] showed that this class of failure is architectural rather than component-level. Each contractor knows their own work, often very well; what no contractor knows is how a decision in one segment cascades through the system. Architectural knowledge is the knowledge of the cascades. In the fragmented chain, architectural knowledge is dispersed across firms that have no mutual obligation to integrate it.

Accountability dispersion. Information loss is exacerbated by the contractual structure. Each contract specifies a segment's deliverable and a segment's price; none of the contracts specifies

the integrated outcome. When integration fails, the buyer searches for a responsible party and finds none. The factory points to the technical pack and notes that the produced item meets the specification. The pattern engineer points to the brief and notes that the specification follows the brief. The designer points to the buyer's reference and notes that the brief reflects the reference. Carson, Madhok and Wu [14] showed empirically that under high environmental and behavioral uncertainty, contractual governance fails to deter opportunism precisely because each party can rationalize its own segment-level decisions against its own segment-level contract; the integrated outcome is the residual that contractual governance cannot reach.

The economic shape of accountability dispersion is asymmetric. Each contractor has clear upside (the segment fee) and clear downside (the segment's contractual penalties). The integrated outcome's upside accrues to the buyer if the chain happens to integrate; the integrated outcome's downside also accrues to the buyer if the chain fails to integrate. The chain is therefore a bet on integration that the buyer is making with the buyer's own balance sheet, while paying each contractor a fee that is independent of how the bet resolves.

Quality erosion. A subtler failure mode operates across cycles rather than within a single one. The reference sample agreed at concept stage is rarely the sample that arrives at the customer's door six seasons later. Material grades drift towards what is currently available on the supplier's preferred terms, hardware finishes towards what is currently economical, lining specifications towards what is currently in stock. At the supplier level each substitution is rational (a marginal cost saving, a logistics convenience, a sourcing simplification), and each is invisible to the buyer when it happens. Audited a few seasons later against the original reference, the cumulative drift is substantial. The literature on architectural innovation [13] and on system integrators that "know more than they make" [3] both anticipate this configuration: when interface knowledge is held only by the suppliers, interface drift accumulates in the suppliers' favor. Helper's [15] historical analysis of buyer-supplier relations in the U.S. automotive industry documents the same pattern with empirical detail; her trajectory from competitive arms-length contracting towards quality erosion is structurally identical to the leather-goods case here, allowing for the obvious differences in industrial setting. Dyer's [16] account of specialized supplier networks at Toyota and Chrysler shows the converse: where lead firms invest deliberately in network-level interface routines and supplier-side knowledge, quality erosion is contained, because the substitutions that would otherwise drift unilaterally are surfaced into a joint review.

The drift is not corrected by inspection. Inspection samples the current production against the current specification; both have moved together over time. Inspection at a single point in time cannot detect a drift that operates between cycles, and no inspection regime that is contractually feasible at the segment level can monitor cross-cycle drift at the collection level.

Calendar-cost compression. The failure modes compound across the lifecycle in a downstream cascade. Information loss upstream produces architectural drift at engineering; architectural drift produces material problems at production; material problems produce inspection findings at outgoing quality control; those findings compress the logistics calendar; the compressed calendar produces premium freight costs and missed seasonal windows. Cooper [17] identified the cost asymmetry that makes this compounding so expensive (see also Crosby's "cost of quality" tradition): the cost of preventing a defect at engineering is a small fraction of the cost of correcting the same defect at production, which is itself a fraction of the cost of correcting it after export. The fragmented chain has no mechanism for early prevention, because the parties that would prevent at engineering are different from the parties that absorb the cost at logistics. The compounding is therefore structural, not operational.

The four failure modes are not independent. Information loss makes integration invisible to the parties, so no contractor can be held

responsible for it, which is the seed of accountability dispersion. Once accountability has dispersed, no party has the standing to refuse the supplier-favoring substitutions that drive quality erosion. Late discovery of those substitutions then consumes calendar, and calendar-cost compression follows. The coupling is tight enough that a partial fix of one mode does not stop the others. Figure 1 shows the causal map.

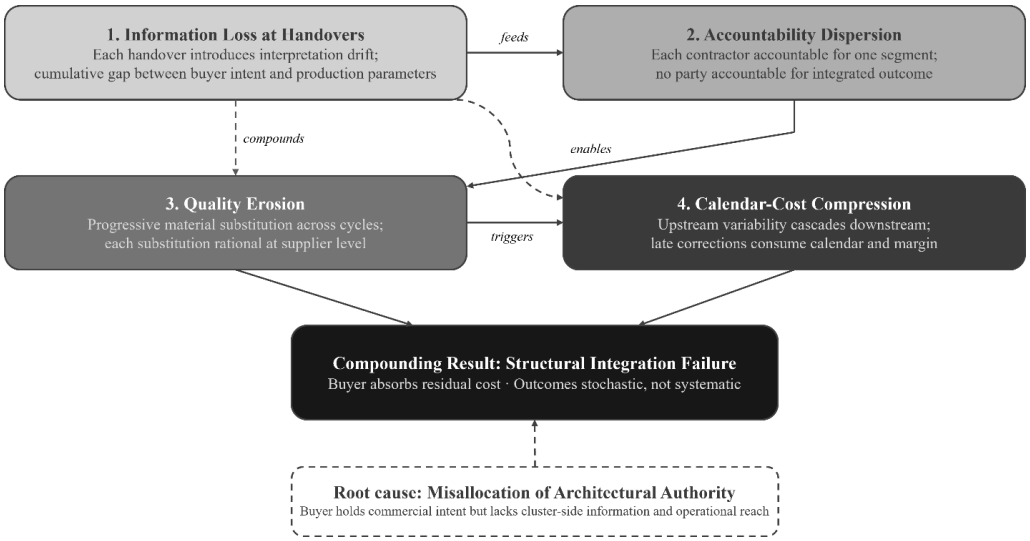

Figure 1 — Causal map of the four structural failure modes

Single-cycle analysis tends to miss a further consequence of the coupling. Across cycles the chain accumulates an institutional memory of its own failures (the buyer's quality logs, the inspection firm's reports, the factory's cost records), yet that memory does not aggregate into architectural learning, because no party in the chain is positioned to integrate it across boundaries. Each contractor's records describe the contractor's segment; the integrated picture is reconstructed, season by season, by the buyer, who has the integrated information for one cycle and limited transfer of it to the next. Mayer and Argyres [12] documented exactly this learning gap and showed that the firms that close it treat contract design as a distinct organizational capability built deliberately over many cycles. Argyres and Mayer [18] developed the same point into a general claim that contract design is itself a firm capability rather than a clerical output. In the fragmented chain that capability has no organizational home: the buyer has the cross-cycle memory but not the cluster-side detail, and the cluster has the cluster-side detail but no incentive to aggregate it across the buyer's cycles.

WHY POINT IMPROVEMENTS DO NOT FIX THE PROBLEM

Practitioners faced with fragmented chains generally try to fix them with point improvements. The library of point improvements is large and predictable: tighter and more detailed specifications; more frequent inspections; permanent on-site representation by the buyer or a hired agent; longer-term contracts with preferred suppliers; bonus-malus schemes for on-time and on-spec delivery; project management discipline applied across the chain. Each of these has its own literature and its own success cases. None changes the architecture that generates the failure modes.

Tighter specifications change the magnitude of information loss without changing its mechanism. The interpretation steps that introduce drift are still present at every handover; richer specifications only change what gets misinterpreted. Brusoni, Prencipe and Pavitt [3] showed that specification intensity increases the architectural integrator's cost without distributing the integrator's role: the firm that knows the most about the system continues to be

the firm that has to specify the system to the firms that know less.

More inspections detect more defects but do not prevent more defects. The cost asymmetry identified by Cooper [17] runs against the inspection strategy: the cost of correcting a defect at outgoing quality control is much higher than the cost of preventing it at engineering, and inspection adds cost at the high end of the asymmetry. Inspection regimes also struggle to detect cross-cycle drift, as discussed earlier in connection with quality erosion.

On-site representation reproduces the buyer's cognitive boundary inside the cluster but does not reproduce the buyer's authority. A representative reports more accurately than a remote buyer can; the representative does not have the authority to swap a supplier mid-cycle, to redefine a phase deliverable, or to override a contractual specification. The representative therefore narrows the information gap without closing the authority gap. The same observation applies to project-management overlays: they carry information across the chain but do not own the chain.

Longer-term contracts and bonus-malus schemes change incentives at the segment level without changing the architecture above the segment level. A factory with a long-term contract has more incentive to maintain quality and less incentive to substitute materials, but the factory's view of the assortment remains the factory's view; the architectural decisions remain unmade above it. Pisano [19] showed empirically that integration outperforms market contracting under specific conditions; long-term contracting is a weak version of integration that captures only the contracting margin, not the architectural margin. Heide and John's [20] study of alliances in industrial purchasing makes the same observation in marketing-channel terms: long-term commitments raise the cost of opportunism but do not, by themselves, build joint problem-solving capacity, and joint problem-solving capacity is what an architectural integration role requires.

Taken together, the four failure modes are properties of the architecture of the chain, not of any individual contract within it. Fixing them at the contract level produces local improvements that do not aggregate into architectural fixes. Henderson and Clark [13] formulated this principle thirty-five years ago, in connection with established firms confronted with architectural innovation: the component-level competence of the firm cannot reconstruct architectural knowledge from below. The same principle holds in the fragmented chain. Table 2 summarizes the structural limitations of each point improvement.

Table 2 — Point improvements and their structural limitations in fragmented contract manufacturing

Point improvement	What it changes	What it does not change	Structural limitation
Tighter specifications	Magnitude of information loss at individual handovers	Mechanism of interpretation drift; number of handovers	Richer specifications increase the integrator's cost without distributing the integrator's role [9]
More frequent inspections	Number of defects detected at output	Number of defects generated at earlier phases	Cost of correction at inspection is structurally higher than cost of prevention at engineering [19]
On-site representation	Accuracy of buyer's information about the cluster	Buyer's operational authority over the supplier configuration	Information gap narrows; authority gap remains intact
Longer-term contracts and bonus-malus schemes	Incentives at the segment level	Architecture above the segment level; no party gains cross-cutting visibility	Long-term contracting captures the contracting margin, not the architectural margin [21]

Project-management overlay	Information flow across the chain	Ownership of phases and authority over transitions	Overlay carries information but does not own the chain

The cost of attempted fixes therefore accumulates without producing architectural payoff. Each point improvement carries its own implementation cost: tighter specifications increase drafting and review effort, more inspections increase QC fees and lead-time, on-site representation incurs salary and supervision costs, long-term contracts require negotiation and lock-in. Where the architecture remains unchanged, these costs are paid in addition to the original failure-mode costs rather than in place of them. A buyer who works through a heavily reinforced fragmented chain ends up with a more expensive version of the same architecture and the same failure profile. Empirical observations in the GVC governance literature [21] are consistent with this pattern: clusters that have been "upgraded" by a richer contractual overlay continue to exhibit the original failure modes, sometimes at higher absolute cost.

The diagnosis is in principle falsifiable, and naming the falsifying observations is part of taking it seriously. The information-loss claim would be refuted by empirical evidence of long, multi-handover fragmented chains producing low cumulative drift between buyer intent and delivered product, in the absence of any compensating relational or integrating mechanism. The accountability-dispersion claim would be refuted by evidence that integrated-outcome failures in fragmented chains are routinely traced to identifiable contractual parties and resolved through standard contractual remedies, rather than absorbed by the buyer. The quality-erosion claim would be refuted by longitudinal evidence that reference samples in fragmented cross-border chains are stable over many cycles without buyer-side or third-party cross-cycle policing. The calendar-cost-compression claim would be refuted by evidence that fragmented chains absorb upstream variability at the upstream phases at which it arises, rather than transmitting the cost downstream. Each of these is an observable pattern; the diagnosis stands or falls with whether the patterns are present.

THE BUYER'S MISALLOCATED ARCHITECTURAL ROLE

The structural locus of the problem is the role the buyer is asked to play. In the fragmented chain the buyer is the only party that holds the integrated commercial intent, the only party that knows what the collection is supposed to be on the destination market. The buyer is therefore cast as the de facto integrating subject and made to perform the architectural integration role that no other party can perform. Figure 2 maps the misallocation.

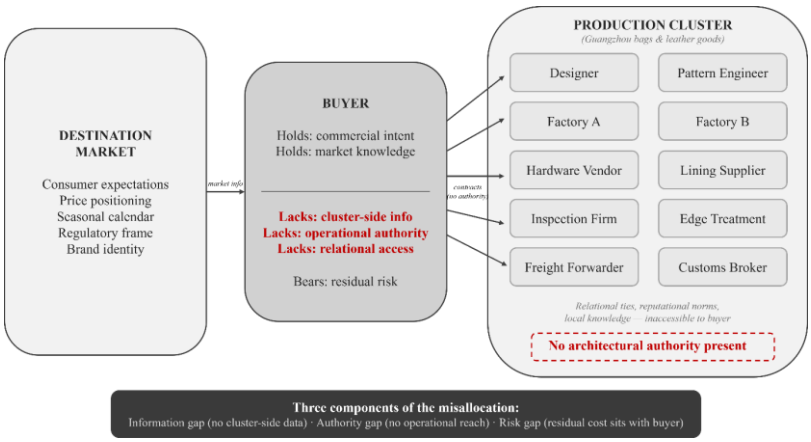

Figure 2 — Buyer's misallocated architectural role in the fragmented OEM chain

The misallocation has three components, each independently disabling. The buyer holds the integrated commercial intent but lacks current information about cluster-side material grades, tooling availability, regulatory updates and supplier reputation; inspection reports and supplier statements can be read, but they cannot be calibrated against alternatives the buyer does not know exist [3]. Commercial authority over the chain (signing contracts, paying bills) does not carry operational authority within the cluster: the buyer cannot swap a supplier mid-cycle without contractual penalty, cannot reconfigure a tooling decision without renegotiation, cannot consolidate a leather order across three suppliers without their cooperation. And the buyer carries the residual risk of integration failure with no operational means to prevent it. Granovetter's [10] embeddedness argument explains why writing better contracts cannot solve this: the cluster's behavior is governed by a local network of social and reputational ties that the buyer is not part of, and the buyer's contractual instruments operate orthogonally to that network rather than through it.

Williamson's [2] distinction between strategizing and economizing sharpens the diagnosis. Integration capacity scales with information capacity and with operational authority together; an integration role that pairs commercial information with non-existent operational information, or that pairs commercial authority with non-existent operational authority, will not perform integration regardless of how aggressively the role is strategised. Holcomb and Hitt [9] make the parallel point in the language of strategic outsourcing: outsourcing is rational where the outsourcing firm retains the integrative knowledge required to combine supplier outputs; where the integrative knowledge is itself outsourced, the firm has not outsourced production but has surrendered the architectural role on which production depends. The buyer's role in the fragmented chain is precisely that surrender, performed inadvertently.

The misallocation is amplified by the cluster's relational geometry. Dyer's [16] study of specialized supplier networks shows that effective lead firms in cross-border production rely on relational ties embedded in geographic and social proximity to the cluster: shared engineers, shared visits, shared trust developed over years. Dyer and Singh's [22] relational view of competitive advantage formalizes this. Rents from interfirm specialization accrue only to partners that have invested jointly in relation-specific assets, in shared communication routines, and in inter-firm knowledge-sharing structures. A cross-border B2B buyer working through a fragmented chain has not made those investments and is structurally not positioned to make them within a contractual budget. The contractual instruments at the buyer's disposal are necessary but not sufficient; the relational infrastructure that converts contracts into integrated outcomes is held by the cluster itself, in routines that the buyer has neither the proximity nor the standing to access.

Because of this misallocation, integrated outcomes appear stochastically rather than systematically. A given cycle, with its particular supplier set, its seasonal calendar, and a buyer who happens to hold more cluster-side knowledge than usual, can produce an integrated collection. The buyer reads the cycle as a success and reproduces the configuration in the next one, only to find the configuration has shifted (the supplier is on a different leather lot, the regulatory framework has updated, new staff hold less cluster-side knowledge) and the integrated outcome no longer appears. Carson, Madhok and Wu [14] characterize exactly this volatility as a property of governance configurations exposed to high environmental and behavioral uncertainty without an offsetting integrating mechanism: outcomes drift between cycles because the governance form cannot stabilize the interaction structure.

CULTURAL DISTANCE AS AMPLIFIER

The cross-cultural layer of the misallocation deserves a separate treatment. Cross-border B2B production violates the assumption of clean inter-firm interfaces at every cultural boundary: the within-component logic of the cluster (what is

producible, what is economical, what is currently available) and the within-component logic of the destination market (what sells, at what price, in what assortment, on what calendar) interact strongly through the assortment's design and through its regulatory frame. In the language of transaction-cost economics, the relevant exchanges combine high asset specificity with high behavioral and environmental uncertainty, which is the configuration Williamson [8] identified as least suited to arms-length contracting and that Rindfleisch and Heide [4] confirmed in their three-decade review.

In a configuration with clean interfaces the integration burden is bounded. Each component can be specified and the integration is relatively cheap. In a configuration with strongly coupled interfaces, by contrast, the burden is open-ended: each component's specification depends on every other component's, and the integrating actor has to hold the entire cross-section in mind to specify any one component well. Brusoni, Prencipe and Pavitt [3] formulated this as the system-integrator paradox: firms that hold integrative knowledge typically know more than they make. The fragmented chain is asked to behave as if cross-border B2B production had clean component interfaces when it does not, and the buyer is asked to perform the integration that clean interfaces would otherwise perform automatically. Dyer and Singh's [22] relational-rent argument identifies the conditions under which cross-firm integration becomes feasible without vertical integration: deliberate relation-specific investment, knowledge-sharing routines, and complementary resource endowments. The cross-border B2B fragmented chain offers none of these.

The amplification matters because it reframes the problem. The fragmented chain is not failing because its participants are insufficiently disciplined; it is failing because the system has strongly coupled interfaces, and the participants are organized as if it had clean ones. The point is straightforward in operation. You can run a tighter factory without changing what the factory is asked to do, and the chain will look better at the segment audit and the same at the destination market. Without an architectural change, more discipline does not produce clean interfaces; it produces more disciplined fragmentation.

Cross-cultural calibration of the assortment to the destination market is performed at the level of the collection's substrates (palette, proportion, tactile finish, regulatory frame), rather than at the level of any single item's specification. Substrate-level calibration is impossible in a chain whose unit of management is the SKU and whose architectural authority is unclaimed. Each item is calibrated against its own brief, not against the collection's destination-market position. Substrate-level calibration that would actually adapt the assortment to the destination market is therefore no one's responsibility. The fragmented chain not only fails to integrate the production parameters; it also fails to integrate the cross-cultural translation, and the two failures compound at the collection level.

CONDITIONS UNDER WHICH FRAGMENTATION REMAINS APPROPRIATE

The diagnosis above is bounded. There are conditions under which the fragmented OEM/ODM chain is the right architecture and an integrated alternative would be overhead. Three condition classes mark the boundary.

Production scope. Where the buyer's order is a single product or a small handful of products with no shared substrates, the integration synergies that arise at the collection level (shared palette, shared hardware, shared materials, shared destination-market positioning) do not apply. The buyer is not buying an integrated assortment; the buyer is buying a product, and the fragmented chain delivers it efficiently. The same applies where the order is a one-off (a sample, a prototype, a marketing capsule) and the seasonal calendar is irrelevant.

Buyer integration capacity. Where the buyer is itself a large operation with in-house architectural capacity (its own pattern engineering, its own materials laboratory, its own production-engineering staff embedded in the cluster), the buyer can perform the architectural integration role internally and the fragmented chain becomes

the buyer's executive layer. Lorenzoni and Lipparini [23] document this configuration in the Italian motorcycle and packaging industries, where lead firms have built durable interfirm capacity for product co-development on top of nominally arms-length supplier relations. Dyer's [16] specialized-supplier-network analysis of Toyota and Chrysler describes the same configuration in the automotive industry: the "integrated" outcome then appears, but it appears because the buyer has constructed an integrating apparatus of its own; the fragmented chain has not been fixed, it has been wrapped.

Product modularity. Where the product is genuinely modular in the engineering sense (clean interfaces between components, specifications that travel well between firms, low coupling between segments), the system-integrator role described by Brusoni, Prencipe and Pavitt [3] can be specified once and enforced contractually, because the cross-segment cascades are bounded by the modular interfaces themselves. Bags and leather goods are at the dirty end of this spectrum; modular electronics, by contrast, are typically at the clean end. The diagnosis above does not generalize to industries where the modularity is genuine.

Embedded relational infrastructure. A configuration in which a long-tenured trading-house intermediary, or a stable network of repeat suppliers bound by reputational ties, sits across the contractual boundaries can produce good integrated outcomes inside an architecturally fragmented chain. Helper's [15] account of the U.S. automobile industry documents both the failure case treated above and the inverse: where buyer-supplier relations had matured into cooperative routines with stable knowledge transfer, the same nominal contractual chain produced quality and on-time delivery indistinguishable from integrated production. Dyer's [16] specialized-supplier-network evidence and Dyer and Singh's [22] relational view formalize the mechanism: a relational infrastructure (shared engineers, repeated cycles, mutual reputational stake, joint problem-solving routines) can substitute for architectural integration by carrying the integrating work informally across the contractual boundaries that the contracts themselves cannot bridge. The configuration is genuine and not rare. For the typical cross-border B2B buyer in the bags-and-leather-goods setting, however, the configuration does not transfer. The relational infrastructure belongs to the cluster, not to the buyer. A buyer that has not invested in repeat dyads, shared visits and cluster-side staff cannot rent that infrastructure on the spot market. The investments may already be in place, or a long-tenured trading-house intermediary may hold them on the buyer's behalf. In those cases the diagnosis above attenuates and the fragmented chain can perform.

These conditions are not exotic. They define a real domain of efficient OEM operation, and the paper's argument should not be read as a universal critique of contract manufacturing. The argument is that outside these conditions, in repeated cross-border collections of multi-component leather goods with seasonal cadence and consumer-market cultural distance, the fragmented chain produces the four failure modes identified above, the failure modes compound, the buyer's misallocated architectural role is the structural locus, and point improvements do not fix the configuration. An architectural response is therefore warranted, although the form that response should take is beyond the scope of this paper.

A buyer evaluating which side of this boundary their own situation sits on can ask one diagnostic question. Who, in the current chain, holds the cross-cutting decisions about the collection's substrates? If the answer is the buyer themselves, working from outside the cluster, the buyer is performing the architectural role and has to assess honestly whether they hold the cluster-side information and the operational authority that role requires. If the answer is no one in particular, with different decisions taken by different parties at different times and integrated nowhere, the chain sits in the structurally vulnerable configuration this paper has diagnosed. If the answer is a single in-house team with cluster-side staff and decision authority over the supplier configuration, the buyer has

constructed an integrating apparatus on top of the fragmented chain, and the question becomes whether that apparatus is more cost-effective than the architectural alternative offered by an integrated provider. The diagnosis here does not prescribe the answer; it specifies the question that has to be answered.

LIMITATIONS

The diagnosis is offered with explicit limitations. First, the paper is conceptual: no quantitative empirical data are presented, and the four failure modes are derived from the transaction-cost and global value chain literatures applied to the cross-border B2B leather-goods setting rather than from a primary measurement programme. Second, the working setting is a single industrial cluster (Guangzhou bags and leather goods), and the extent to which the diagnosis transfers to clusters with different relational geometries, regulatory environments or product mixes is itself an open question rather than a demonstrated result. Third, a selection-bias risk is intrinsic to a setting in which the failures are observed by a participant who has already concluded that the fragmented architecture is structurally limited; the falsification conditions stated above are intended to discipline this risk, but they do not eliminate it. Fourth, the paper does not demonstrate the architectural alternative; it specifies the structural problem the alternative is designed against. Showing that an integrated alternative resolves the failure modes without introducing offsetting costs is a separate task, deferred to companion papers in the intended series. The diagnosis offered here is therefore a self-contained negative claim about the fragmented architecture, not a positive claim about any particular substitute for it.

CONCLUSION

Three implications follow from the diagnosis offered in this paper, and they operate at different levels of the buyer's decision.

At the level of the buyer's own architecture, the analysis suggests that an honest answer to "who holds the cross-cutting decisions about the collection's substrates?" is more diagnostic than any audit of suppliers' performance metrics. A chain whose integrating actor is unnamed will produce the four failure modes regardless of how disciplined its components become. Buyers without cluster-side staff, without repeat dyads and without operational authority inside the cluster have, in effect, taken on an architectural role they cannot execute, and the costs surface as residual rather than as recognized expenditure.

At the level of the supplier system, the analysis reframes what an "upgrade" is supposed to upgrade. Richer contractual overlays, denser inspection, longer-tenured relationships and stricter penalties redistribute cost across the chain without altering the architecture above it. An upgrade that does not relocate architectural authority is a more expensive instance of the original configuration, and the residual cost remains with the buyer. Practitioners who recognize this can stop investing in fixes whose ceiling is structurally bounded.

At the level of the literature, the paper contributes a setting in which the transaction-cost prediction (that misalignment between governance form and exchange attributes produces costs proportional to the asset specificity and uncertainty in play) is observed at the architectural rather than the contractual level, and in which the integrating actor that the system-integrator literature postulates is structurally absent. Williamson's [8] transaction-cost economics and the global value chain governance frame of Gereffi, Humphrey and Sturgeon [24] supply the vocabulary; the architectural-authority misallocation identified here is a corollary that the cross-border B2B setting makes unusually legible. Whether the architectural alternative that this diagnosis logically motivates is more cost-effective than a heavily reinforced fragmented chain is an empirical question for companion work; the present paper has argued only that the architectural question, having been asked, cannot honestly be answered by another point improvement.

CONSENT FOR PUBLICATION

Not applicable. The work does not involve human

or animal subjects, and no patient or third-party consent is required. The author consents to the publication of the paper in its present form.

CONFLICT OF INTEREST

The author is the originator and principal architect of the one-window methodology, the architectural alternative to which the structural diagnosis in this paper logically points. He currently serves as the Executive Director and Legal Representative of Guangzhou San Units Trading Limited, a company that operates this architecture in the Guangzhou bags and leather goods production cluster. This relationship constitutes a non-financial competing interest with respect to the diagnosis presented. No financial competing interests are declared.

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