



The System Architect in Contract Manufacturing: A New Model of Centralized Responsibility and Lifecycle Governance

Pavlo Morozov

Executive Director and Legal Representative, Guangzhou San Units Trading Limited, Guangzhou, China.

ORCID: 0009-0002-7212-3053

Abstract

Cross-border business-to-business contract manufacturing typically depends on fragmented configurations. Design, engineering, production, quality control and logistics are scattered across independent contractors, every handover loses some integration, and the buyer absorbs decisions that no single supplier can make. The Guangzhou bags and leather goods cluster supplies the operational anchor; the conceptual contribution is pitched at contract-manufacturing governance in general. Existing frameworks cover parts of the problem but stop short of the role at its center. Stage-Gate models govern phase transitions inside one firm, global value chain theory classifies governance modes between firms, and dynamic capabilities theory locates sensing and seizing at enterprise level. None describes the individual who, inside a fragmented foreign cluster, holds architectural authority and accountability for the buyer's integrated outcome. Drawing on long-standing operational practice in the Guangzhou cluster as analytical context, and on foundational works in system architecture, transaction cost economics, Stage-Gate governance, global value chains and dynamic capabilities, the review specifies that subject as the System Architect. The architect differs in kind from a coordinator: a coordinator processes information about handovers, whereas the architect works inside the lifecycle and authors the gate decisions that determine what each phase delivers. The role decomposes into nine non-substitutable dimensions: market-request interpretation, collection design, architecture, quality erosion prevention, gate-decision authority, sourcing-variability access, criticality control, cross-cultural translation, scaling capacity and institutional memory. The architect operates as the single decision authority at collection-level gates, collapsing the corporate Stage-Gate committee into an inter-firm subject that moves at seasonal speed. The system properties buyers pay for emerge from this centralized orchestration rather than from contractual specifications. The role is functionally non-substitutable under three jointly necessary conditions, and imitation rebuilds the original fragmentation in more elaborate form. The article names an architectural subject so far left unspecified by cross-border B2B governance, framing the claim in deliberately falsifiable terms for comparative testing.

Keywords: Contract Manufacturing Governance, Dynamic Managerial Capabilities, Gate-Decision Authority, One-Window Business Architecture, System Architect.

INTRODUCTION

The cross-border B2B segment of bags and leather goods manufacturing operates through fragmented contractual chains (Gereffi, Humphrey, & Sturgeon, 2005). A typical project passes through the hands of designers, pattern engineers, factories, quality inspectors, freight operators and customs brokers, each accountable for one slice of the lifecycle. Williamson (1985) read this configuration as a transaction-cost bargain: lateral coordination saves on hierarchical authority and pushes the synchronization work onto the buyer. In an industry where product specifications

interact tightly with raw-material variability, geographic distance from the consumer market and short seasonal windows, that synchronization work hardens into structural risk.

Point improvements to fragmented chains tend to produce only local effects. Tighter specifications and more aggressive in-line inspection regimes, sometimes paired with an on-site buyer agent, reduce specific failure modes without changing the architecture itself. Each contractual segment continues to optimize inside its own information horizon. A design that satisfies aesthetic and merchandising criteria may be

Citation: Pavlo Morozov, "The System Architect in Contract Manufacturing: A New Model of Centralized Responsibility and Lifecycle Governance", Universal Library of Business and Economics, 2026; 3(1): 130-139. DOI: <https://doi.org/10.70315/uloap.ulbec.2026.0301016>.

infeasible at the bill-of-materials level. A factory that fulfils the technical pack may produce a product whose packaging volume undermines logistics economics. A quality inspection that meets a sampling standard may pass material-grade substitutions that are invisible at the inspection point. Henderson and Clark (1990) showed that this kind of failure originates in architectural rather than component knowledge, in the understanding of how decisions in one component cascade through the system. Karna, Richter, and Riesenkampff (2016) document a related effect across a meta-analytic sample of capability studies, in which the performance returns to ordinary capabilities are dominated by those of higher-order architectural reconfiguration once environmental dynamism rises. Where architectural knowledge is dispersed across independent firms, the chain produces no architectural decisions at all, only locally rational ones.

The architectural response examined here relocates architectural decisions into a single managerial subject called the System Architect. The architect is not a project manager, a sourcing agent or a contract coordinator. The role carries integrated authority and accountability for the full lifecycle of a collection, from interpreting the market request to closing cross-border delivery, and exercises that authority through formalized gate decisions at every transition between phases.

The conceptual gap addressed in this paper is the underspecification of that role. Brusoni, Prencipe, and Pavitt (2001) describe the firm-level integrator that «knows more than it makes» but locate the integrator at organizational rather than personal level. The Stage-Gate literature (Cooper, 1990, 2008) describes phase-gate governance but assumes a corporate review committee rather than a personal authority embedded in a foreign cluster. The dynamic capabilities literature (Teece, 2007; Teece, Pisano, & Shuen, 1997), and the systematic review by Schilke, Hu, and Helfat (2018), place sensing, seizing and transforming at enterprise level and acknowledge that the individual carriers of those capabilities remain underspecified. What none of these traditions captures is the actor who works inside a fragmented cross-border production cluster. Such an actor sees across phases and decides on binding terms. The position also requires supplier-network access. Reputational capital, accumulated cycle by cycle, is what keeps architectural integrity intact through a multi-stage lifecycle.

Several adjacent constructs need to be set aside before the proposition is sharpened. The systems-integrator firm in the Hobday-Davies-Prencipe tradition, exemplified by Brusoni et al. (2001), is a corporate entity that holds architectural knowledge across components produced by specialized suppliers, and its integration is performed through firm-level engineering, contracting and risk-management apparatus.

The architect analyzed here is an individual subject inside a production cluster, not a corporate entity holding contracts with suppliers, and the integration is performed through embodied managerial authority at gates rather than through firm-level engineering. The lead firm in modular or relational global value chain governance (Gereffi et al., 2005) holds asymmetric power over upstream suppliers through codification, certification or relational ties, but does not exercise gate authority inside the supplier's lifecycle and does not carry single-point accountability for the integrated outcome at the buyer's destination market. The engineering, procurement and construction-management contractor common in capital projects sits closest to the role at first glance, but it is contractually bounded by a defined project scope and discharged on completion; the architect role examined here is collection-cyclical and continuous, with institutional memory accumulated across cycles being a constitutive dimension rather than a contractual residual. None of the three constructs therefore subsumes the architect, and the conceptual move is not redundant.

The paper develops a conceptual account of this role in dialogue with the cited academic literatures around five propositions. The architect is categorically different from the OEM coordinator and from the corporate Stage-Gate committee. The role breaks down into nine non-substitutable functional dimensions. The architect serves as the single decision authority at collection-level gates. Buyers actually pay for consistent delivery against window and price under shifting cluster conditions. That outcome emerges from centralized orchestration; contractual specifications, even when summed, do not produce it. And the role is functionally non-substitutable under specifiable conditions, with attempts to imitate it through nominal restructuring rebuilding the original fragmentation in more elaborate form. The Discussion takes up these five propositions in turn.

MATERIALS AND METHODS

The work is a conceptual review paper whose contribution is concept development rather than statistical generalization. The paper draws on two source bases. The first is long-standing operational practice in the Guangzhou bags and leather goods cluster, used as informed analytical context for cross-border B2B production governance. This context informs the analysis without being treated as a citable authority. It supplies the operational anchor through which the architect role becomes visible. Explicit gate criteria, role boundaries and lifecycle structure are inductively recognizable across repeated seasonal cycles serving wholesale B2B clients in geographically diverse destination markets. The author's positioning is therefore explicitly auto-ethnographic: the analytical lens is constituted through participation in the very arrangement being conceptualised, no negative cases or external comparators are included at

this stage, and the present specification is offered as input to a comparative case-validation programme rather than as a claim already validated.

The secondary source base comprises foundational and widely cited works in five complementary literatures. The first is systems and product architecture as a source of architectural-knowledge asymmetry (Brusoni et al., 2001; Henderson & Clark, 1990). The second is Stage-Gate governance of new product development (Cooper, 1990, 2008). The third is transaction cost economics and inter-firm governance (Williamson, 1985). The fourth is global value chain governance (Gereffi et al., 2005). The fifth, central to the architect specification, is dynamic capabilities theory and its managerial microfoundations (Adner & Helfat, 2003; Augier & Teece, 2009; Felin & Foss, 2009; Helfat & Martin, 2014; Helfat & Peteraf, 2014; Schilke et al., 2018; Teece, 2007; Teece et al., 1997), together with cognitive accounts of the manager (Eggers & Kaplan, 2013; Maitland & Sammartino, 2015) and capability-performance synthesis (Karna et al., 2016). Two further anchors situate the analysis: organizational design (Mintzberg, 1979) and upper-echelons theory of executive discretion (Hambrick & Mason, 1984), with cultural-distance work (Hofstede, 2001; Kogut & Singh, 1988) supporting the cross-cultural-translation dimension and Furr and Eisenhardt's (2021) review of strategy under uncertainty supporting the gate-decision dimension.

Three analytical operations were applied. A role-extraction pass identified the activities of the architectural subject as observable in cross-border contract manufacturing and grouped them into a compact set of functional dimensions. A literature-mapping pass then checked each dimension against the closest established construct in the academic literatures cited above, in order to locate the conceptual gap and the contribution of the architect role. A condition analysis identified the situational and organizational conditions under which the architect role is constitutive of the system rather than ancillary to it, together with the failure modes when those conditions are violated. The paper tests no predictive hypotheses and produces no statistical generalization. What it offers is conceptual clarification, a clearer concept that future empirical work, in adjacent industries and via case-based methods, can operationalize and test.

DISCUSSION

Architect versus coordinator. Mintzberg (1979) describes coordination as the work of aligning interdependent activities through information processing across organizational boundaries. In fragmented contract manufacturing, coordination is performed by the buyer's project manager, by sourcing agents, by inspection firms and by freight forwarders. Each coordinator works between participants, receiving outputs from one segment and arranging inputs

for the next. The coordinator processes information about the system but does not author it.

The System Architect occupies a different position. The architect works inside the lifecycle as its decision authority, not at the seams between phases but as the subject who defines what each phase will deliver, what counts as completion, and what the next phase therefore receives. Three differences make this distinction operational.

The first concerns the temporal location of decisions. Coordinators act after problems show up: a deviation appears, a coordinator escalates, and a resolution is negotiated. Architects act before problems show up. Design feasibility against tooling, costing against pricing, packing against freight, and export readiness against destination-market regulation are all checked at the gate that precedes the phase whose output would otherwise produce the deviation. Cooper (1990) framed the underlying asymmetry directly: the cost of preventing a defect at the engineering stage is a small fraction of the cost of correcting the same defect in serial production, which is itself a fraction of the cost of correcting it after export. The architect institutionalizes that asymmetry by holding gate authority.

The second difference concerns scope of authority. The coordinator holds influence over what happens at the handover. The architect holds authority over the configuration of the participants themselves. In a mature production cluster the architect's accumulated network of verified suppliers, pattern shops, edge-treatment specialists and packaging vendors works as a portfolio of substitutable capacity. The architect can swap an underperforming supplier within a production cycle without losing collection-level integrity, because the swap is governed by the same technical pack and gate criteria that defined the original supplier's contribution. A coordinator cannot do this; a coordinator can only escalate.

The third difference concerns the unit of accountability. The coordinator's accountability is segmented and contractual. The architect's accountability is end-to-end and architectural: the architect is the single point of accountability for whether the collection arrives in the destination country in the form, at the cost and within the time window that the market request implied. Williamson (1985) anticipated this move at the abstract level. Hierarchical governance, in his account, is not just a substitution of authority for contract; it relocates residual claims and residual control to a single integrating actor. The architect is exactly that actor at the inter-firm level, embedded in the production cluster yet acting on behalf of the buyer's commercial outcome.

The distinction is not semantic; it produces operationally different artifacts. A coordinated chain produces a bundle

of contracts, and integrating what comes out of that bundle is the buyer's problem. An architected chain produces a product system, a collection in which components and the processes that produce them are causally connected by design and whose export readiness is engineered into the same structure, and the integration of the system belongs to the architect. The buyer of a coordinated chain receives goods. The buyer of an architected chain receives a market-ready product.

A common imitation strategy tries to acquire architectural outcomes by relabelling coordinators. A regional representative is hired to «own the result»; a more elaborate inspection regime is installed; multi-stakeholder review meetings replace individual decisions. Henderson and

Clark (1990) showed that architectural knowledge cannot be reconstructed from component-level routines: the architectural subject has to hold cross-cutting visibility and decision authority at the same time. Where the imitation lacks that simultaneity, the chain becomes more elaborate without becoming more architectural, and the buyer's coordination cost rises rather than falls.

Nine functional dimensions of the architect role. Breaking the architect role down into discrete functional dimensions turns the abstract claim of architectural authority into an auditable specification. Nine dimensions can be analytically extracted from the architect role as it operates in cross-border B2B contract manufacturing, summarised in Table 1 and developed below.

Table 1. The nine functional dimensions of the System Architect role

Dimension	Operational content	Closest academic anchor
Market-request interpretation	Translation of buyer intent into a Positioning Frame fixing assortment, price ceiling, technological envelope and export parameters	Sensing microfoundation (Teece, 2007)
Collection design and architecture	Design of the assortment matrix, constructive optimization, synchronization of sketches with BOM feasibility and production constraints; engineering supervision of Tech Pack development (EPP)	Product architecture (Ulrich, 1995; Henderson & Clark, 1990)
Gate-decision authority	Single-subject Go / Rework within Phase / Pause & Escalation decisions at every phase transition	Stage-Gate logic (Cooper, 1990, 2008)
Sourcing-variability access	Cluster-side access to supplier, material and process variability not contractually transferable	Knowledge specialization (Brusoni et al., 2001)
Criticality control	Concentration of supervisory attention on irreversible or cascading-cost nodes	Dynamic capabilities (Teece, 2007)
Cross-cultural translation	Conversion of destination-market codes into producible specifications	Cultural distance (Hofstede, 2001; Kogut & Singh, 1988)
Scaling capacity	Verification of new suppliers and extension of gate discipline across portfolio growth	Capability-performance synthesis (Karna et al., 2016)
Quality erosion prevention	Cross-cycle monitoring of material grades and construction specifications; blocking covert substitutions by suppliers; maintaining Golden Sample integrity across production runs	Architectural knowledge asymmetry (Brusoni et al., 2001)
Institutional memory	Curation of structured residuals (verified suppliers, technical packs, adaptations, failures) across cycles	Microfoundations of routines (Felin & Foss, 2009)

Market-request interpretation. The buyer's expressed request is rarely structurally complete; it is a partial description of a commercial intent encoded in the buyer's local information. The architect translates the request into a Positioning Frame, a constraint structure that fixes the assortment matrix, the price ceiling, the technological envelope and the export-readiness parameters of the future collection. This dimension corresponds, in Teece's (2007) vocabulary, to the sensing microfoundation, but it is not performed at enterprise level by a corporate scanning function. It is performed by an

individual carrying the cluster-side production information that the buyer lacks. Helfat and Martin (2014) reformulate sensing as a dynamic managerial capability, a capacity to perceive opportunity that sits in specific managers rather than diffused across the firm, and Adner and Helfat (2003) document the firm-level performance differences that follow from this concentration. The architect is the inter-firm analogue of the manager whose dynamic capability anchors the sensing work.

Gate-decision authority. The architect makes the Go / Rework

within Phase / Pause & Escalation decision at every formal transition between phases. The criteria are pre-specified and shared with the buyer; the decision is centralized in a single accountable subject. This dimension translates Cooper's (1990) Stage-Gate logic from corporate committee governance into a single-subject inter-firm governance, with the gates placed at the actual handover points of a fragmented cluster.

Sourcing-variability access. The architect sits inside the production cluster as a physical and operational presence whose reputational standing has been earned cycle by cycle. That position is itself a productive resource. It gives access to material-grade variability and to specialized process capacity, including skiving, edge treatment, hardware plating, lining lamination and metallic-finish post-processing, and to micro-suppliers that an external buyer cannot identify, qualify or contract with at acceptable risk. Brusoni et al. (2001) describe such access at the level of integrating firms; the architectural arrangement analyzed here relocates it to the individual architect.

Criticality control. Not every deviation matters equally. The architect concentrates supervisory attention on the nodes where errors are irreversible or where their downstream cost cascades disproportionately, such as leather grading and nesting, edge-treatment selection, hardware specification and export documentation. This criticality routing is a microfoundation of dynamic capabilities (Teece, 2007). Eggers and Kaplan (2013), reviewing cognition and capabilities at multiple levels, show that selective managerial attention, rather than generic information processing, is what shapes which deviations a firm acts on; Helfat and Peteraf (2014) reformulate the same effect at the microfoundational level as managerial cognitive capability, the ability to perceive, judge and interpret strategically relevant signals. The architect is the inter-firm carrier of that cognitive capability, allocating scarce attention to where it produces the most architectural value.

Cross-cultural translation. Hofstede (2001) and Kogut and Singh (1988) document the operational consequences of cultural distance in cross-border production. In bags and leather goods these consequences are concrete: color palettes legible in one market are inert in another; size proportions optimized for one carrying context fail in another; tactile-finish expectations differ between price tiers in different markets. The architect translates the destination-market aesthetic and functional codes into producible specifications. The operation is not a marketing function. It is an engineering specification function performed under cultural-translation constraints. Maitland and Sammartino (2015) show, based on cognitive-task analysis of senior managers in international firms, that managerial cognition rather than firm-level routine carries most of the cross-cultural interpretation work in international expansion; the architect's translation

function is the inter-firm analogue, performed for a buyer that is structurally outside the producing market.

Scaling capacity. Vertical scaling (higher volumes within the existing supplier set) and horizontal scaling (new clients, new categories) both depend on the architect's capacity to verify additional suppliers, to extend the technical-documentation discipline and to keep the gate logic intact across an expanded portfolio. It is essential that the system's scaling rate is limited by the architect's managerial bandwidth, and scaling beyond that bandwidth degrades the architecture into ordinary coordination.

Institutional memory. Each completed cycle leaves behind structured residuals: verified supplier records, validated technical packs, market-specific adaptation patterns and recorded failure modes. The architect curates this residual. Felin and Foss (2009) argue that organizational routines and capabilities have to be traced back to individual choice and learning rather than treated as collective black boxes; the architect is the individual in whom that learning accumulates and from whom the routines the system reproduces actually originate. This accumulation also matches what Schilke et al. (2018), in their systematic review of dynamic capabilities, identify as the ageing-and-experience component of capability, a property that cannot be procured contractually because it is a residual of cycle-by-cycle operation. Without curation by the architect, the memory dissolves with personnel turnover and the system loses one of its main returns to scale.

The nine dimensions are non-substitutable. Dropping any one of them compromises the architectural function as a whole, and concrete counterfactuals make the boundary cases visible. An architect with full sourcing-variability access but no gate authority cannot stop a costed-but-infeasible design from entering tooling. The reason is structural: rejection at the Engineering Feasibility gate is the only mechanism that converts cluster-side knowledge into a binding decision. Without that mechanism, the asymmetry described by Cooper (1990) reasserts itself, and downstream rework consumes the saving that the access could otherwise have delivered. An architect with full gate authority but no sourcing-variability access can issue a Rework decision but cannot execute it at acceptable cost, because rerouting an underperforming supplier within the seasonal window depends on a verified portfolio of substitutes that only positional embeddedness produces; in its absence, the gate decision produces schedule loss rather than recovery. A subject with full operational authority but without institutional memory loses the cumulative advantage that turns the architect role from a service into an asset, because each cycle restarts the verified-supplier list, the market-adaptation register and the failure-mode log from scratch. A single subject holds all nine dimensions together, and the architectural outcome follows from that composition (Figure 1).

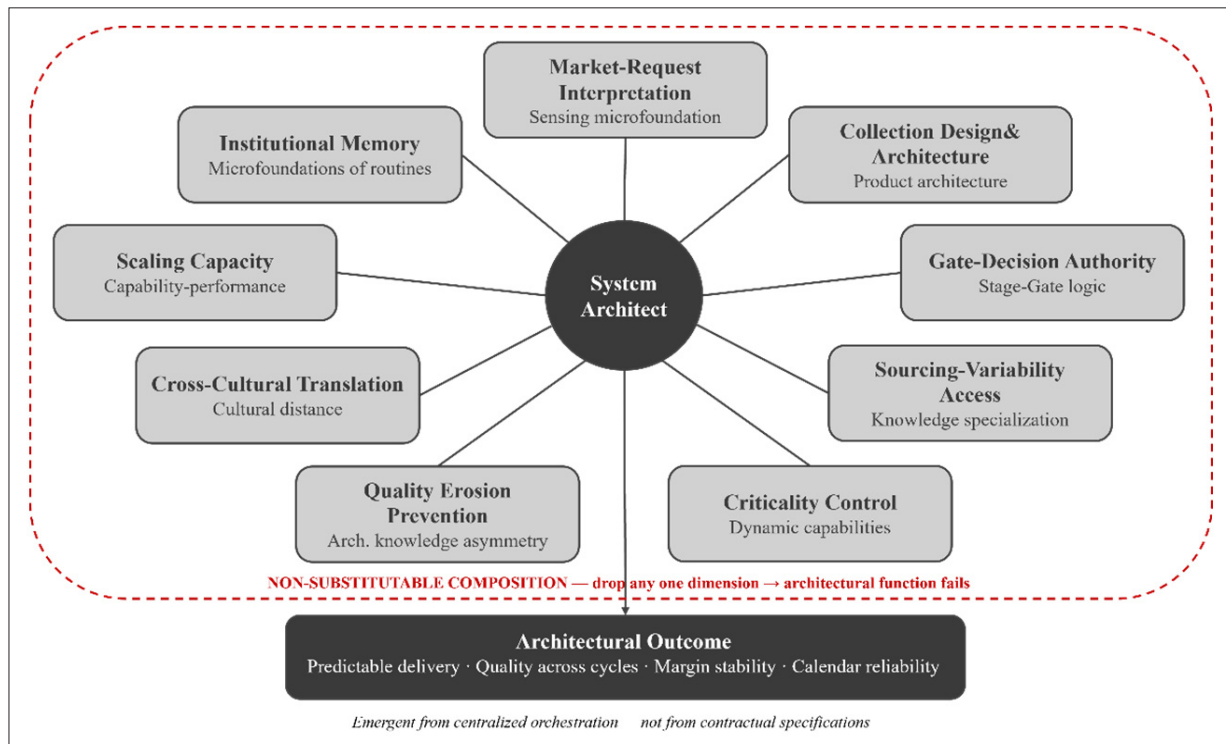


Figure 1. Composition of the System Architect role and its architectural outcome

The architect at collection-level gates. Conventional Stage-Gate practice (Cooper, 1990, 2008) operates at the level of an individual product idea: a stage produces a deliverable, a gate evaluates it, and a portfolio committee decides on continuation. Three features of cross-border B2B production in bags and leather goods make this product-level frame insufficient.

The unit of economic management is the collection, not the individual stock-keeping unit. Materials are shared across items, hardware is unified, costing is balanced across the assortment, and freight optimization is performed on the aggregated carton and container plan. A gate that approves an item in isolation may approve a configuration that breaks the cost balance of the collection. Furr and Eisenhardt (2021) review the strategy-under-uncertainty literature and emphasise that in turbulent environments coherent strategic action depends on bundles of interacting decisions rather than on isolated product choices, since shared resources, capabilities and external dependencies couple those decisions together. By defensible inference, the collection in cross-border B2B manufacturing functions as such a bundle, and the architect's gate authority has to operate over it as the commitment unit.

Gate criteria are also heterogeneous across phases, including engineering feasibility, costing against the price ceiling, prototype validation, raw-material conformity, in-process consistency, export readiness, and post-shipment conformance. No corporate review committee sitting outside the cluster carries the cross-cutting expertise required to evaluate that range of criteria. The architect inside the cluster does.

A further feature is the speed at which gate decisions need to be made. A sub-six-month seasonal window is incompatible with committee governance. Cooper (2008) himself acknowledges that bureaucratic drift undermines Stage-Gate's value when speed matters. The architectural arrangement analyzed here resolves the tension by collapsing the committee into a single subject, with criteria pre-formalized so that the architect's decision is governed by the criteria rather than by the architect's discretion.

The result is a Collection-level Gate Governance regime that keeps the formal discipline of Cooper's framework while being executable at seasonal speed. The architect's signature on a gate carries weight on two counts: it certifies, at the same time, that the technical condition of the collection meets the criterion and that the architect has personally ascertained that condition. Dual certification is the operational form of the single-point-of-accountability principle.

The architectural framework outlined here specifies seven gates spanning the lifecycle (Figure 2). Concept Validation closes the interpretation phase; Engineering Feasibility / Design Freeze closes the technical-pack phase; Design Validation / Prototype Sign-off closes prototyping and approves the Golden Sample; Production Readiness / IQC & Sourcing closes raw-material qualification and incoming quality control; In-Process Quality Control / First-Article Approval verifies the first article against the Golden Sample and monitors process drift during serial production; Final Production Validation / FQC closes the production phase with statistical AQL audit; and Export Readiness closes the cross-border shipment with verification of documentation, certificates and packaging integrity. The number of functional

dimensions of the role (nine) and the number of gates in the lifecycle (seven) are not in one-to-one correspondence; the

count of each is dictated by its own analytical logic, and no claim of structural pairing between them is intended.

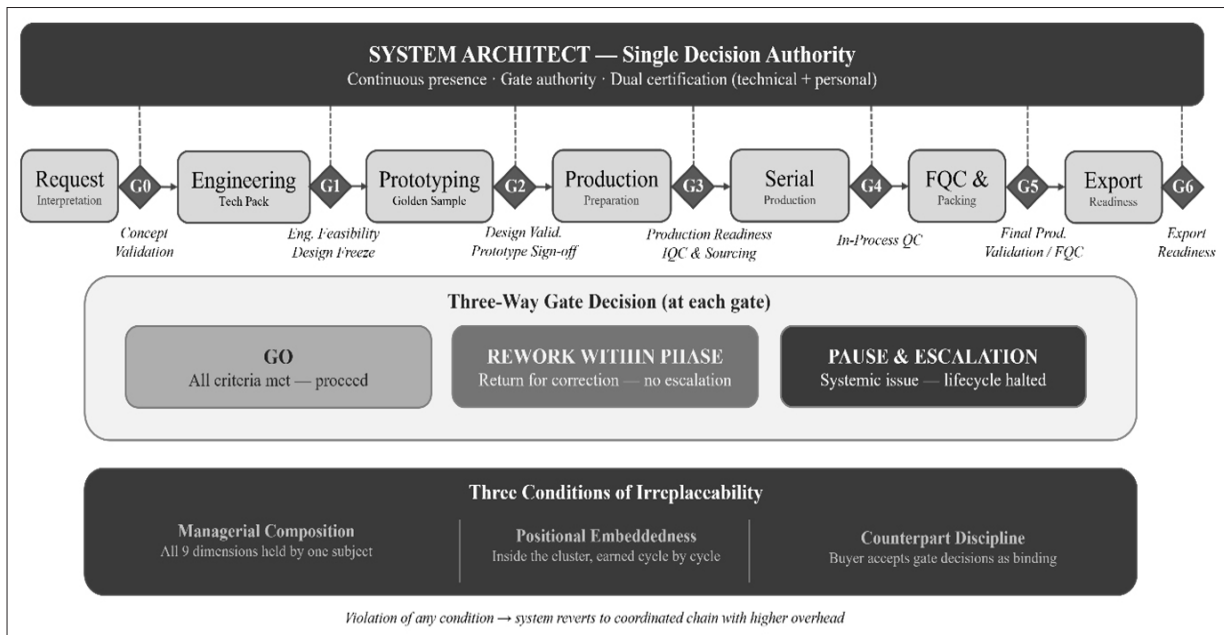


Figure 2. Collection-level gate sequence under the System Architect's authority

At each gate the architect issues a Go, Rework within Phase or Pause & Escalation decision. Rework — return to a previous phase — is permitted and is treated as a normal operating mode rather than as a failure of the system.

Gate authority is non-delegable. Where the architectural arrangement breaks down in implementation, the most frequent cause is the delegation of gate decisions to executors at the operational level. Operational executors optimize inside the current phase rather than between phases, and the architectural integration that the gates exist to produce is lost.

Architectural emergence. The properties buyers ultimately purchase are not properties of any individual component of the production chain. Predictable delivery against window and price, quality that holds across cycles, and margin that does not erode under scaling are emergent properties of the architecture as a whole. Helfat and Peteraf (2014) locate an analogous effect at the firm level. Capabilities of integration, in their account of managerial cognition, are not additive over the capabilities of the parts. Such integration belongs to an organising cognitive layer that coordinates the parts. Adner and Helfat (2003), in their original study of dynamic managerial capabilities, document corporate-effects performance differences that cannot be attributed to industry or firm endowment but that track the heterogeneity of integrating managers. Augier and Teece (2009) make the implication for managerial agency explicit, arguing that managers and the choices they make are constitutive of dynamic capability rather than peripheral to it. The architect is the inter-firm carrier of that agency.

The architect produces this emergence in three ways. The

local optimizations of each participant are constrained by the cross-cutting parameters of the collection: a factory that would otherwise lower its cost by substituting a leather grade is held to the technical pack and to Production Readiness verification, and a logistics provider that would otherwise optimize on container fill is held to the export-readiness parameters set at Concept Validation. Decisions are connected causally rather than treated in isolation. A design choice is evaluated against its nesting yield before it enters tooling; a hardware specification is checked against the regulatory regime of the destination market; and packaging is set in light of the unit-economics envelope that follows from container fill and tariff classification. And the architect carries what is left over: the integrated outcome belongs to the architect even when no single component of the chain has produced it on its own.

One consequence is that emergence is not robust to architect substitution. The system is not a set of artifacts that can be handed to another holder; it is an ongoing operational practice that is reproduced cycle by cycle by the architect's continuing presence and authority. Brusoni et al. (2001) describe an analogous asymmetry, that of firms that «know more than they make», at the firm level; the architectural arrangement examined here relocates that asymmetry to an individual subject. This is what is meant by the claim that the architectural arrangement and the architect cannot be separated. The arrangement specifies how the system is organized; the architect is the subject in whom the organizational specification becomes operational reality.

A practical implication for buyers is that the system resists disintermediation. Hiring a local representative in the production cluster is the most common buyer attempt to

replicate the architect's positional access. Such attempts can reproduce the visibility dimension of the role, but they rarely reproduce gate authority and the criticality-control work that depends on it, and they almost never reproduce the institutional memory that accumulates only across many cycles in the same hands. The architectural outcome therefore fails to appear in the substantive sense buyers expect, even though some of its preconditions are now in place.

Conditions of irreplaceability and risks of imitation. The architect role is constitutive of the system, and therefore irreplaceable, under three jointly necessary conditions. Managerial composition requires the architect to hold all nine functional dimensions at once, because holding only some of them produces a coordinator rather than an architect. Positional embeddedness requires a position inside the production cluster that yields continuous access to supplier-network variability, to regulatory and material-grade information and to the reputational capital required

for verified-supplier qualification; Brusoni et al. (2001) note that this kind of embeddedness is not contractually transferable. Operational discipline of counterparts requires the buyer to accept the architect's gate decisions as binding and to refrain from reversing validated phases. When buyers reopen Concept Validation decisions during prototyping, or override Production Readiness decisions to recover schedule, architectural integrity is lost. Counterpart discipline is therefore not optional but constitutive. Hambrick and Mason (1984) framed an analogous conditional efficacy through upper-echelons theory. Organizational outcomes, in their account, reflect the cognitive base and values of the dominant decision-maker. The reflection is conditional on the discretion the role is allowed to exercise. The architect's discretion is the inter-firm analogue of the upper-echelon discretion, and the three conditions are what determine whether the discretion is real or nominal. Table 2 summarizes the three conditions and the failure modes that appear when each is violated.

Table 2. Conditions of irreplaceability and failure modes upon violation

Condition	Requirement	Failure mode when violated
Managerial composition	Architect holds all nine dimensions at once	Title without dimensions: chain stays coordinated, label changes nothing
Positional embeddedness	Position inside cluster with continuous access to supplier networks, regulatory information and reputational capital	Portfolio exceeds bandwidth: gate scrutiny shallows out, architecture silently degrades into reactive coordination
Counterpart discipline	Buyer accepts gate decisions as binding; does not reverse validated phases	Gate overrides: formal structure persists but integration breaks; upstream rework destroys calendar and margin

When the conditions are violated, three failure modes appear. The first arises when an organization appoints someone with the title of system architect but without the nine dimensions; the chain stays coordinated, and the new label changes nothing about how decisions are actually authored. The second appears when a working architect's portfolio expands beyond manageable scope. Bandwidth is consumed, gate scrutiny shallows out, and the architectural function quietly degrades into reactive coordination while the title and the language remain in place. The third appears when buyer-side or executor-side actors override validated gate decisions. The formal structure persists but the integration it was supposed to produce breaks. All three rebuild the original fragmentation in more elaborate form, with higher overhead.

The architectural claim advanced here is therefore narrow and falsifiable. It does not assert that integrated architectures always outperform fragmented ones, since small, episodic, single-product transactions remain efficiently served by classical OEM. It does assert that for the specific class of cross-border B2B collections with seasonal cycles, multi-market export and multi-component product systems, the

architect role is the necessary integrating subject and that no decentralized arrangement reproduces its outcomes.

Observable proxies for architected versus coordinated chains. To make the conceptual distinction operational, several observable indicators distinguish architected from coordinated chains and could anchor future empirical work. The numerical thresholds offered below are practitioner-anchored indicative ranges, calibrated against the operational context that informs this paper rather than derived from prior studies, and they should be empirically refined and benchmarked through the comparative case work proposed in the Conclusion. First, lead-time variance across cycles in the order of ten percent of the planned window points toward an architected chain. Architectural integration tends to absorb phase-level disturbances before they propagate. Coordinated chains under comparable seasonal pressure tend to exhibit variance roughly twice as large. Second, a defect rate at the Final Production Validation gate held in the low single percentages of inspected units, paired with rejection rates that remain stable as portfolio scope grows, suggests that gate-decision and criticality-control dimensions are operating; coordinated chains

tend to show defect-rate growth roughly proportional to portfolio expansion. Third, supplier-swap latency, measured as the time from identifying an underperforming supplier to executing a verified replacement, of the order of a few weeks within the production cycle indicates that sourcing-variability access and institutional memory are co-located in the same subject; coordinated chains typically require new qualification cycles measured in months. Fourth, a low gate-reversal frequency, that is, a small share of validated phases reopened by buyer-side or executor-side actors, indicates that the operational discipline of counterparts condition holds. These four indicators are jointly sensitive to the conditions that distinguish architectural from coordinative governance and could be measured comparatively across producers in adjacent clusters.

Limitations. The argument carries four limitations that future work should address. First, the evidence base is largely self-referential, in that the analytical context comes from a single operating arrangement rather than from independently observed cases; the conceptual claims therefore stand or fall with subsequent third-party empirical testing. Second, this self-referential basis carries an explicit circularity risk: the dimensions through which the architect role is described are also the dimensions through which its success has been observed, so the role's necessity has been argued conceptually rather than demonstrated against negative cases. Third, generalisability beyond the bags and leather goods context is untested; product systems with looser component coupling, longer cycles, or weaker cultural-translation requirements may admit substitutes for some of the nine dimensions that this analysis treats as jointly necessary. Fourth, the analytical context is a single production cluster in Guangzhou, and inter-cluster heterogeneity in supplier density, regulatory environment and managerial labour markets may modify which conditions of irreplaceability bind in other geographies. Comparative case work and structured cross-cluster sampling would be the natural next step.

CONCLUSION

The conceptual contribution of this paper is the specification of the System Architect as a distinct, named managerial subject in cross-border B2B contract manufacturing. The role differs in kind from coordination. It operates at gate decisions rather than at handovers; it is centrally accountable rather than segmentally accountable; and it carries what is left over from the integrated outcome rather than the sum of locally optimal outputs. Its content can be specified along nine dimensions (market-request interpretation, collection design and architecture, quality erosion prevention, gate-decision authority, sourcing-variability access, criticality control, cross-cultural translation, scaling capacity and institutional memory), and its value comes from holding those dimensions together in a single subject embedded in the production cluster.

The paper reframes three established literatures. Stage-Gate (Cooper, 1990, 2008), originally developed for intra-firm new product development, is reformulated for inter-firm cross-border manufacturing with collection-level governance and a single decision authority. Global value chain governance (Gereffi et al., 2005), traditionally framed at firm and chain level, is supplemented with an architectural subject at the level of an individual integrating actor. Dynamic capabilities (Teece, 2007; Teece et al., 1997), an enterprise-level construct, gains an inter-firm microfoundation: the architect carries out the sensing and seizing work on behalf of a buyer who is structurally outside the producing cluster, and reconfigures the supplier portfolio over cycles in ways that the buyer cannot, in line with the managerial-cognition turn synthesised by Schilke et al. (2018).

For owners and operations directors of B2B brands sourcing from cross-border clusters, the practical implication is that the system whose outputs they pay for cannot be obtained by stacking controls on a fragmented chain. It requires a subject who composes the nine dimensions and is granted the authority and the counterpart discipline to exercise them. For the wider managerial and policy discussion of cross-border manufacturing, the implication is that standard governance frameworks understate this role and overstate the substitutability of the actors who currently fill it.

Several research directions follow. Comparative case studies across adjacent product categories such as apparel, footwear and consumer electronics would test how generally the nine-dimension specification holds. Quantitative work could measure how margin and lead-time outcomes vary between architected and coordinated chains. Conceptual work could extend the architect role to multi-cluster configurations where a single architect orchestrates production across more than one geography.

ACKNOWLEDGEMENTS

The author thanks the production teams, suppliers and B2B partners in the Guangzhou bags and leather goods cluster whose long-term collaboration within the author's one-window architecture provided the operational context and empirical basis for the present work.

REFERENCES

1. Adner, R., & Helfat, C. E. (2003). Corporate effects and dynamic managerial capabilities. *Strategic Management Journal*, 24(10), 1011–1025. <https://doi.org/10.1002/smj.331>
2. Augier, M., & Teece, D. J. (2009). Dynamic capabilities and the role of managers in business strategy and economic performance. *Organization Science*, 20(2), 410–421. <https://doi.org/10.1287/orsc.1090.0424>
3. Brusoni, S., Prencipe, A., & Pavitt, K. (2001). Knowledge specialization, organizational coupling, and the

- boundaries of the firm: Why do firms know more than they make? *Administrative Science Quarterly*, 46(4), 597–621. <https://doi.org/10.2307/3094825>
4. Cooper, R. G. (1990). Stage-gate systems: A new tool for managing new products. *Business Horizons*, 33(3), 44–54. [https://doi.org/10.1016/0007-6813\(90\)90040-I](https://doi.org/10.1016/0007-6813(90)90040-I)
 5. Cooper, R. G. (2008). Perspective: The Stage-Gate idea-to-launch process — Update, what's new, and NexGen systems. *Journal of Product Innovation Management*, 25(3), 213–232. <https://doi.org/10.1111/j.1540-5885.2008.00296.x>
 6. Eggers, J. P., & Kaplan, S. (2013). Cognition and capabilities: A multi-level perspective. *Academy of Management Annals*, 7(1), 295–340. <https://doi.org/10.5465/19416520.2013.769318>
 7. Felin, T., & Foss, N. J. (2009). Organizational routines and capabilities: Historical drift and a course-correction toward microfoundations. *Scandinavian Journal of Management*, 25(2), 157–167. <https://doi.org/10.1016/j.scaman.2009.02.003>
 8. Furr, N. R., & Eisenhardt, K. M. (2021). Strategy and uncertainty: Resource-based view, strategy-creation view, and the hybrid between them. *Journal of Management*, 47(7), 1915–1935. <https://doi.org/10.1177/01492063211011760>
 9. Gereffi, G., Humphrey, J., & Sturgeon, T. (2005). The governance of global value chains. *Review of International Political Economy*, 12(1), 78–104. <https://doi.org/10.1080/09692290500049805>
 10. Hambrick, D. C., & Mason, P. A. (1984). Upper echelons: The organization as a reflection of its top managers. *Academy of Management Review*, 9(2), 193–206. <https://doi.org/10.5465/amr.1984.4277628>
 11. Helfat, C. E., & Martin, J. A. (2014). Dynamic managerial capabilities: Review and assessment of managerial impact on strategic change. *Journal of Management*, 41(5), 1281–1312. <https://doi.org/10.1177/0149206314561301>
 12. Helfat, C. E., & Peteraf, M. A. (2014). Managerial cognitive capabilities and the microfoundations of dynamic capabilities. *Strategic Management Journal*, 36(6), 831–850. <https://doi.org/10.1002/smj.2247>
 13. Henderson, R. M., & Clark, K. B. (1990). Architectural innovation: The reconfiguration of existing product technologies and the failure of established firms. *Administrative Science Quarterly*, 35(1), 9–30. <https://doi.org/10.2307/2393549>
 14. Hofstede, G. (2001). *Culture's consequences: Comparing values, behaviors, institutions, and organizations across nations* (2nd ed.). Sage.
 15. Karna, A., Richter, A., & Riesenkampff, E. (2016). Revisiting the role of the environment in the capabilities–financial performance relationship: A meta-analysis. *Strategic Management Journal*, 37(6), 1154–1173. <https://doi.org/10.1002/smj.2379>
 16. Kogut, B., & Singh, H. (1988). The effect of national culture on the choice of entry mode. *Journal of International Business Studies*, 19(3), 411–432. <https://doi.org/10.1057/palgrave.jibs.8490394>
 17. Maitland, E., & Sammartino, A. (2015). Managerial cognition and internationalization. *Journal of International Business Studies*, 46(7), 733–760. <https://doi.org/10.1057/jibs.2015.9>
 18. Mintzberg, H. (1979). *The structuring of organizations*. Prentice-Hall.
 19. Schilke, O., Hu, S., & Helfat, C. E. (2018). Quo vadis, dynamic capabilities? A content-analytic review of the current state of knowledge and recommendations for future research. *Academy of Management Annals*, 12(1), 390–439. <https://doi.org/10.5465/annals.2016.0014>
 20. Teece, D. J. (2007). Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal*, 28(13), 1319–1350. <https://doi.org/10.1002/smj.640>
 21. Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7), 509–533. [https://doi.org/10.1002/\(SICI\)1097-0266\(199708\)18:7<509::AID-SMJ882>3.0.CO;2-Z](https://doi.org/10.1002/(SICI)1097-0266(199708)18:7<509::AID-SMJ882>3.0.CO;2-Z)
 22. Williamson, O. E. (1985). *The economic institutions of capitalism*. Free Press.