Computer-Vision Robustness as Deal Diligence: Demographics, Lighting and Devices

An Evidence-Gated M&A Framework for Performance Dispersion, Release Risk and Valuation Adjustment

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September 2026

Abstract

Computer-vision businesses can appear scalable when diligence relies on a single benchmark, a reference camera and an average accuracy score. Actual performance can vary across demographics, intersectional cohorts, lighting, pose, range, motion, occlusion, resolution, compression, devices, geography, software versions and release channels. Those variations can affect customer outcomes, market access, support cost, claims, retention, gross margin and acquisition value. This paper develops an evidence-gated framework for testing computer-vision robustness in M&A and investment diligence. Forty modules connect the investment question, asset perimeter, version control, intended use, evaluation population, data rights, cohort design, capture conditions, environmental stress, ground truth, sampling, task metrics, failure to acquire, false decisions, calibration, thresholds, perturbations, domain shift, presentation attacks, human review, system integration, compute economics, monitoring, supplier risk, regulatory exposure, remediation, commercial scalability, valuation and close gates. Five figures, five tables, eight frequently asked questions and twenty-six primary or authoritative references support use-, population-, condition-, device-, jurisdiction- and period-specific review. The framework requires reproducible segmented evidence and an explicit link from technical dispersion to transaction consequences. It does not establish that any system is accurate, fair, compliant, investable or fit for a particular purpose and does not substitute for authorised technical, biometric, privacy, equality, cybersecurity, legal, tax, accounting or regulatory advice.

JEL Classification: G34, G24, C45, L86, O32, K24, K42

Keywords: computer vision, M&A diligence, robustness, demographic performance, lighting, devices, domain shift, valuation adjustment, artificial intelligence

1. Frame the investment question

Define the target product, decision consequence, markets, customers and valuation claim.

The controlled record includes scope; version; population; condition; device; metric; source; reviewer; decision. The immediate deliverable is an approved robustness diligence charter. Preserve jurisdiction, effective date, model and software version, test population, capture conditions, device configuration, reviewer, approval and unresolved exceptions.

The principal failure occurs when a generic accuracy score is accepted as evidence of commercial scalability. Reviewers should reproduce the relevant tests, segment the result, examine tail outcomes and identify who may approve, remediate or withhold the transaction recommendation.

Computer-vision diligence should test the complete deployed system across the people, environments, hardware and release channels that support the investment thesis.

The decision pack for frame the investment question should show the prior claim, tested evidence, correction, commercial consequence, alternative response, owner, due date, next evidence gate and observed outcome. Material exceptions flow into the remediation budget, transaction protections and valuation case.

2. Map the vision asset perimeter

Inventory models, datasets, labels, cameras, optics, firmware, preprocessing, postprocessing and human controls.

The controlled record includes scope; version; population; condition; device; metric; source; reviewer; decision. The immediate deliverable is a controlled asset register. Preserve jurisdiction, effective date, model and software version, test population, capture conditions, device configuration, reviewer, approval and unresolved exceptions.

The principal failure occurs when material dependencies remain outside the diligence perimeter. Reviewers should reproduce the relevant tests, segment the result, examine tail outcomes and identify who may approve, remediate or withhold the transaction recommendation.

Averages are weak transaction evidence when failures concentrate in specific cohorts, devices, capture conditions or market deployments.

The decision pack for map the vision asset perimeter should show the prior claim, tested evidence, correction, commercial consequence, alternative response, owner, due date, next evidence gate and observed outcome. Material exceptions flow into the remediation budget, transaction protections and valuation case.

3. Freeze versions and release channels

Identify production, pilot, mobile, edge, cloud and customer-specific builds with hashes and dates.

The controlled record includes scope; version; population; condition; device; metric; source; reviewer; decision. The immediate deliverable is a version and release map. Preserve jurisdiction, effective date, model and software version, test population, capture conditions, device configuration, reviewer, approval and unresolved exceptions.

The principal failure occurs when tests cover a development build that customers never use. Reviewers should reproduce the relevant tests, segment the result, examine tail outcomes and identify who may approve, remediate or withhold the transaction recommendation.

The diligence record should preserve reproducible inputs, versioned outputs, uncertainty, exceptions, reviewer authority and the financial consequence of each gap.

The decision pack for freeze versions and release channels should show the prior claim, tested evidence, correction, commercial consequence, alternative response, owner, due date, next evidence gate and observed outcome. Material exceptions flow into the remediation budget, transaction protections and valuation case.

4. Define use cases and consequences

Separate identification, verification, detection, classification, tracking and measurement by decision consequence.

The controlled record includes scope; version; population; condition; device; metric; source; reviewer; decision. The immediate deliverable is a use-case consequence matrix. Preserve jurisdiction, effective date, model and software version, test population, capture conditions, device configuration, reviewer, approval and unresolved exceptions.

The principal failure occurs when results from one task are used to support another. Reviewers should reproduce the relevant tests, segment the result, examine tail outcomes and identify who may approve, remediate or withhold the transaction recommendation.

A buyer can connect robustness evidence to market access, customer retention, remediation cost, contractual protection and valuation scenarios.

The decision pack for define use cases and consequences should show the prior claim, tested evidence, correction, commercial consequence, alternative response, owner, due date, next evidence gate and observed outcome. Material exceptions flow into the remediation budget, transaction protections and valuation case.

5. Establish evaluation populations

Define intended users, affected people, excluded cohorts and jurisdictional coverage.

The controlled record includes scope; version; population; condition; device; metric; source; reviewer; decision. The immediate deliverable is a population coverage statement. Preserve jurisdiction, effective date, model and software version, test population, capture conditions, device configuration, reviewer, approval and unresolved exceptions.

The principal failure occurs when a convenient test population is treated as the addressable market. Reviewers should reproduce the relevant tests, segment the result, examine tail outcomes and identify who may approve, remediate or withhold the transaction recommendation.

Computer-vision diligence should test the complete deployed system across the people, environments, hardware and release channels that support the investment thesis.

The decision pack for establish evaluation populations should show the prior claim, tested evidence, correction, commercial consequence, alternative response, owner, due date, next evidence gate and observed outcome. Material exceptions flow into the remediation budget, transaction protections and valuation case.

6. Audit data provenance and rights

Trace collection, consent, licence, transfer, annotation and retention for evaluation data.

The controlled record includes scope; version; population; condition; device; metric; source; reviewer; decision. The immediate deliverable is a data-rights dossier. Preserve jurisdiction, effective date, model and software version, test population, capture conditions, device configuration, reviewer, approval and unresolved exceptions.

The principal failure occurs when the buyer inherits unusable or unlawfully sourced evidence. Reviewers should reproduce the relevant tests, segment the result, examine tail outcomes and identify who may approve, remediate or withhold the transaction recommendation.

Averages are weak transaction evidence when failures concentrate in specific cohorts, devices, capture conditions or market deployments.

The decision pack for audit data provenance and rights should show the prior claim, tested evidence, correction, commercial consequence, alternative response, owner, due date, next evidence gate and observed outcome. Material exceptions flow into the remediation budget, transaction protections and valuation case.

7. Design the cohort taxonomy

Specify age, sex, skin tone and other relevant attributes with lawful collection and review.

The controlled record includes scope; version; population; condition; device; metric; source; reviewer; decision. The immediate deliverable is an approved cohort schema. Preserve jurisdiction, effective date, model and software version, test population, capture conditions, device configuration, reviewer, approval and unresolved exceptions.

The principal failure occurs when broad categories conceal performance dispersion. Reviewers should reproduce the relevant tests, segment the result, examine tail outcomes and identify who may approve, remediate or withhold the transaction recommendation.

The diligence record should preserve reproducible inputs, versioned outputs, uncertainty, exceptions, reviewer authority and the financial consequence of each gap.

The decision pack for design the cohort taxonomy should show the prior claim, tested evidence, correction, commercial consequence, alternative response, owner, due date, next evidence gate and observed outcome. Material exceptions flow into the remediation budget, transaction protections and valuation case.

8. Test intersectional cohorts

Measure combinations of attributes where sample size and lawful use permit.

The controlled record includes scope; version; population; condition; device; metric; source; reviewer; decision. The immediate deliverable is an intersectional evidence table. Preserve jurisdiction, effective date, model and software version, test population, capture conditions, device configuration, reviewer, approval and unresolved exceptions.

The principal failure occurs when single-variable analysis misses concentrated failure. Reviewers should reproduce the relevant tests, segment the result, examine tail outcomes and identify who may approve, remediate or withhold the transaction recommendation.

A buyer can connect robustness evidence to market access, customer retention, remediation cost, contractual protection and valuation scenarios.

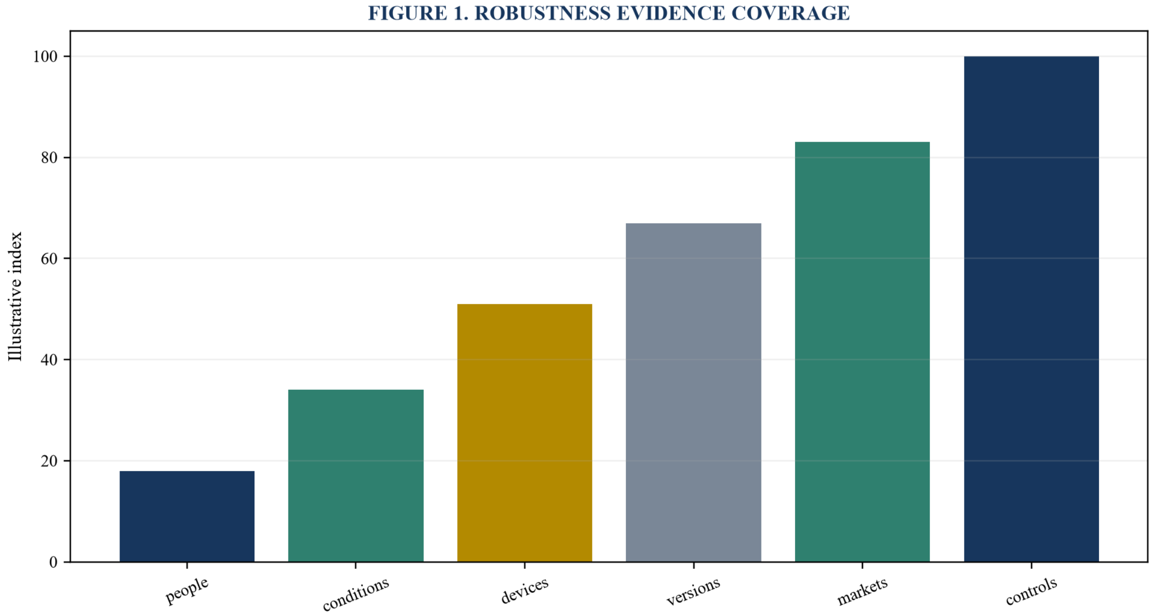
The decision pack for test intersectional cohorts should show the prior claim, tested evidence, correction, commercial consequence, alternative response, owner, due date, next evidence gate and observed outcome. Material exceptions flow into the remediation budget, transaction protections and valuation case.

Table 1. Robustness evidence cube

Dimension	Test question	Required evidence
people	who experiences error	cohort results
environment	where performance changes	condition curves
hardware	which device constrains output	device matrix
release	which build was tested	version record

Illustrative controls require use-, population-, condition-, device-, jurisdiction- and period-specific approval.

Figure 1. Robustness evidence coverage



Values are illustrative indices and require replacement with approved diligence evidence.

9. Control the capture pipeline

Document sensor, lens, distance, pose, exposure, focus, compression and preprocessing.

The controlled record includes scope; version; population; condition; device; metric; source; reviewer; decision. The immediate deliverable is a capture-control specification. Preserve jurisdiction, effective date, model and software version, test population, capture conditions, device configuration, reviewer, approval and unresolved exceptions.

The principal failure occurs when uncontrolled capture changes are attributed to the model. Reviewers should reproduce the relevant tests, segment the result, examine tail outcomes and identify who may approve, remediate or withhold the transaction recommendation.

Computer-vision diligence should test the complete deployed system across the people, environments, hardware and release channels that support the investment thesis.

The decision pack for control the capture pipeline should show the prior claim, tested evidence, correction, commercial consequence, alternative response, owner, due date, next evidence gate and observed outcome. Material exceptions flow into the remediation budget, transaction protections and valuation case.

10. Stress lighting conditions

Test low light, backlight, glare, shadows, colour temperature and mixed illumination.

The controlled record includes scope; version; population; condition; device; metric; source; reviewer; decision. The immediate deliverable is a lighting robustness curve. Preserve jurisdiction, effective date, model and software version, test population, capture conditions, device configuration, reviewer, approval and unresolved exceptions.

The principal failure occurs when laboratory lighting supports an overstated result. Reviewers should reproduce the relevant tests, segment the result, examine tail outcomes and identify who may approve, remediate or withhold the transaction recommendation.

Averages are weak transaction evidence when failures concentrate in specific cohorts, devices, capture conditions or market deployments.

The decision pack for stress lighting conditions should show the prior claim, tested evidence, correction, commercial consequence, alternative response, owner, due date, next evidence gate and observed outcome. Material exceptions flow into the remediation budget, transaction protections and valuation case.

11. Stress exposure and colour

Vary dynamic range, white balance, saturation and sensor response.

The controlled record includes scope; version; population; condition; device; metric; source; reviewer; decision. The immediate deliverable is an exposure and colour analysis. Preserve jurisdiction, effective date, model and software version, test population, capture conditions, device configuration, reviewer, approval and unresolved exceptions.

The principal failure occurs when image rendering shifts cohort performance without detection. Reviewers should reproduce the relevant tests, segment the result, examine tail outcomes and identify who may approve, remediate or withhold the transaction recommendation.

The diligence record should preserve reproducible inputs, versioned outputs, uncertainty, exceptions, reviewer authority and the financial consequence of each gap.

The decision pack for stress exposure and colour should show the prior claim, tested evidence, correction, commercial consequence, alternative response, owner, due date, next evidence gate and observed outcome. Material exceptions flow into the remediation budget, transaction protections and valuation case.

12. Stress pose and range

Measure off-axis views, elevation, distance, scale and partial visibility.

The controlled record includes scope; version; population; condition; device; metric; source; reviewer; decision. The immediate deliverable is a pose and range envelope. Preserve jurisdiction, effective date, model and software version, test population, capture conditions, device configuration, reviewer, approval and unresolved exceptions.

The principal failure occurs when performance collapses outside a narrow acquisition geometry. Reviewers should reproduce the relevant tests, segment the result, examine tail outcomes and identify who may approve, remediate or withhold the transaction recommendation.

A buyer can connect robustness evidence to market access, customer retention, remediation cost, contractual protection and valuation scenarios.

The decision pack for stress pose and range should show the prior claim, tested evidence, correction, commercial consequence, alternative response, owner, due date, next evidence gate and observed outcome. Material exceptions flow into the remediation budget, transaction protections and valuation case.

13. Test occlusion

Measure masks, eyewear, headwear, hair, equipment and partial obstruction relevant to use.

The controlled record includes scope; version; population; condition; device; metric; source; reviewer; decision. The immediate deliverable is an occlusion benchmark. Preserve jurisdiction, effective date, model and software version, test population, capture conditions, device configuration, reviewer, approval and unresolved exceptions.

The principal failure occurs when routine occlusion creates systematic failure. Reviewers should reproduce the relevant tests, segment the result, examine tail outcomes and identify who may approve, remediate or withhold the transaction recommendation.

Computer-vision diligence should test the complete deployed system across the people, environments, hardware and release channels that support the investment thesis.

The decision pack for test occlusion should show the prior claim, tested evidence, correction, commercial consequence, alternative response, owner, due date, next evidence gate and observed outcome. Material exceptions flow into the remediation budget, transaction protections and valuation case.

14. Test motion and blur

Vary subject motion, camera motion, shutter and stabilization.

The controlled record includes scope; version; population; condition; device; metric; source; reviewer; decision. The immediate deliverable is a motion robustness report. Preserve jurisdiction, effective date, model and software version, test population, capture conditions, device configuration, reviewer, approval and unresolved exceptions.

The principal failure occurs when static-image success fails in operational video. Reviewers should reproduce the relevant tests, segment the result, examine tail outcomes and identify who may approve, remediate or withhold the transaction recommendation.

Averages are weak transaction evidence when failures concentrate in specific cohorts, devices, capture conditions or market deployments.

The decision pack for test motion and blur should show the prior claim, tested evidence, correction, commercial consequence, alternative response, owner, due date, next evidence gate and observed outcome. Material exceptions flow into the remediation budget, transaction protections and valuation case.

15. Test resolution and compression

Vary pixel density, cropping, codecs, bitrate and transmission artefacts.

The controlled record includes scope; version; population; condition; device; metric; source; reviewer; decision. The immediate deliverable is a resolution and codec matrix. Preserve jurisdiction, effective date, model and software version, test population, capture conditions, device configuration, reviewer, approval and unresolved exceptions.

The principal failure occurs when channel compression invalidates the benchmark. Reviewers should reproduce the relevant tests, segment the result, examine tail outcomes and identify who may approve, remediate or withhold the transaction recommendation.

The diligence record should preserve reproducible inputs, versioned outputs, uncertainty, exceptions, reviewer authority and the financial consequence of each gap.

The decision pack for test resolution and compression should show the prior claim, tested evidence, correction, commercial consequence, alternative response, owner, due date, next evidence gate and observed outcome. Material exceptions flow into the remediation budget, transaction protections and valuation case.

16. Build the device matrix

Test representative cameras, mobile devices, edge hardware, optics and firmware.

The controlled record includes scope; version; population; condition; device; metric; source; reviewer; decision. The immediate deliverable is a device performance matrix. Preserve jurisdiction, effective date, model and software version, test population, capture conditions, device configuration, reviewer, approval and unresolved exceptions.

The principal failure occurs when one reference device is presented as hardware independence. Reviewers should reproduce the relevant tests, segment the result, examine tail outcomes and identify who may approve, remediate or withhold the transaction recommendation.

A buyer can connect robustness evidence to market access, customer retention, remediation cost, contractual protection and valuation scenarios.

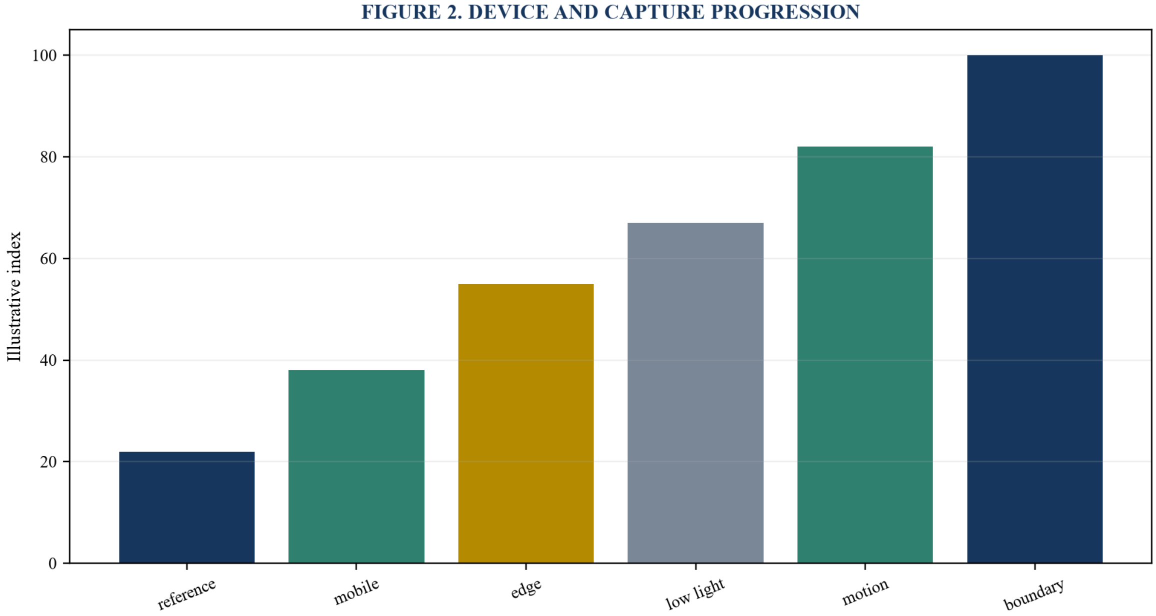
The decision pack for build the device matrix should show the prior claim, tested evidence, correction, commercial consequence, alternative response, owner, due date, next evidence gate and observed outcome. Material exceptions flow into the remediation budget, transaction protections and valuation case.

Table 2. Device and capture matrix

Variable	Stress condition	Transaction evidence
camera	sensor, lens and firmware	comparative benchmark
capture	range, pose and motion	operating envelope
image	light, resolution and codec	sensitivity curve
system	edge, cloud and network	service-level result

Illustrative controls require use-, population-, condition-, device-, jurisdiction- and period-specific approval.

Figure 2. Device and capture progression



Values are illustrative indices and require replacement with approved diligence evidence.

17. Test environmental conditions

Cover heat, cold, humidity, dust, rain, vibration and electromagnetic effects where relevant.

The controlled record includes scope; version; population; condition; device; metric; source; reviewer; decision. The immediate deliverable is an environmental evidence pack. Preserve jurisdiction, effective date, model and software version, test population, capture conditions, device configuration, reviewer, approval and unresolved exceptions.

The principal failure occurs when physical conditions degrade the complete system. Reviewers should reproduce the relevant tests, segment the result, examine tail outcomes and identify who may approve, remediate or withhold the transaction recommendation.

Computer-vision diligence should test the complete deployed system across the people, environments, hardware and release channels that support the investment thesis.

The decision pack for test environmental conditions should show the prior claim, tested evidence, correction, commercial consequence, alternative response, owner, due date, next evidence gate and observed outcome. Material exceptions flow into the remediation budget, transaction protections and valuation case.

18. Test geography and locale

Cover regional appearance, clothing, signage, backgrounds and operating practices.

The controlled record includes scope; version; population; condition; device; metric; source; reviewer; decision. The immediate deliverable is a geography coverage assessment. Preserve jurisdiction, effective date, model and software version, test population, capture conditions, device configuration, reviewer, approval and unresolved exceptions.

The principal failure occurs when deployment geography differs materially from training evidence. Reviewers should reproduce the relevant tests, segment the result, examine tail outcomes and identify who may approve, remediate or withhold the transaction recommendation.

Averages are weak transaction evidence when failures concentrate in specific cohorts, devices, capture conditions or market deployments.

The decision pack for test geography and locale should show the prior claim, tested evidence, correction, commercial consequence, alternative response, owner, due date, next evidence gate and observed outcome. Material exceptions flow into the remediation budget, transaction protections and valuation case.

19. Validate ground truth

Use independent labeling, adjudication, provenance and uncertainty controls.

The controlled record includes scope; version; population; condition; device; metric; source; reviewer; decision. The immediate deliverable is a governed reference corpus. Preserve jurisdiction, effective date, model and software version, test population, capture conditions, device configuration, reviewer, approval and unresolved exceptions.

The principal failure occurs when developer judgments become unquestioned truth. Reviewers should reproduce the relevant tests, segment the result, examine tail outcomes and identify who may approve, remediate or withhold the transaction recommendation.

The diligence record should preserve reproducible inputs, versioned outputs, uncertainty, exceptions, reviewer authority and the financial consequence of each gap.

The decision pack for validate ground truth should show the prior claim, tested evidence, correction, commercial consequence, alternative response, owner, due date, next evidence gate and observed outcome. Material exceptions flow into the remediation budget, transaction protections and valuation case.

20. Sample boundary and long-tail cases

Stratify normal, adverse, rare, novelty and foreseeable misuse conditions.

The controlled record includes scope; version; population; condition; device; metric; source; reviewer; decision. The immediate deliverable is a risk-weighted sample plan. Preserve jurisdiction, effective date, model and software version, test population, capture conditions, device configuration, reviewer, approval and unresolved exceptions.

The principal failure occurs when average-case sampling excludes value-destructive failures. Reviewers should reproduce the relevant tests, segment the result, examine tail outcomes and identify who may approve, remediate or withhold the transaction recommendation.

A buyer can connect robustness evidence to market access, customer retention, remediation cost, contractual protection and valuation scenarios.

The decision pack for sample boundary and long-tail cases should show the prior claim, tested evidence, correction, commercial consequence, alternative response, owner, due date, next evidence gate and observed outcome. Material exceptions flow into the remediation budget, transaction protections and valuation case.

21. Select task-specific metrics

Use false match, false non-match, precision, recall, detection and tracking metrics appropriate to the decision.

The controlled record includes scope; version; population; condition; device; metric; source; reviewer; decision. The immediate deliverable is a metric specification. Preserve jurisdiction, effective date, model and software version, test population, capture conditions, device configuration, reviewer, approval and unresolved exceptions.

The principal failure occurs when one headline metric obscures operational error. Reviewers should reproduce the relevant tests, segment the result, examine tail outcomes and identify who may approve, remediate or withhold the transaction recommendation.

Computer-vision diligence should test the complete deployed system across the people, environments, hardware and release channels that support the investment thesis.

The decision pack for select task-specific metrics should show the prior claim, tested evidence, correction, commercial consequence, alternative response, owner, due date, next evidence gate and observed outcome. Material exceptions flow into the remediation budget, transaction protections and valuation case.

22. Measure failure to acquire

Record images and subjects for which the system produces no usable result.

The controlled record includes scope; version; population; condition; device; metric; source; reviewer; decision. The immediate deliverable is a failure-to-acquire analysis. Preserve jurisdiction, effective date, model and software version, test population, capture conditions, device configuration, reviewer, approval and unresolved exceptions.

The principal failure occurs when excluded acquisitions make reported accuracy look stronger. Reviewers should reproduce the relevant tests, segment the result, examine tail outcomes and identify who may approve, remediate or withhold the transaction recommendation.

Averages are weak transaction evidence when failures concentrate in specific cohorts, devices, capture conditions or market deployments.

The decision pack for measure failure to acquire should show the prior claim, tested evidence, correction, commercial consequence, alternative response, owner, due date, next evidence gate and observed outcome. Material exceptions flow into the remediation budget, transaction protections and valuation case.

23. Control false negatives

Measure missed people, objects, defects and events by cohort and condition.

The controlled record includes scope; version; population; condition; device; metric; source; reviewer; decision. The immediate deliverable is a segmented miss-risk report. Preserve jurisdiction, effective date, model and software version, test population, capture conditions, device configuration, reviewer, approval and unresolved exceptions.

The principal failure occurs when commercial harm concentrates in omissions. Reviewers should reproduce the relevant tests, segment the result, examine tail outcomes and identify who may approve, remediate or withhold the transaction recommendation.

The diligence record should preserve reproducible inputs, versioned outputs, uncertainty, exceptions, reviewer authority and the financial consequence of each gap.

The decision pack for control false negatives should show the prior claim, tested evidence, correction, commercial consequence, alternative response, owner, due date, next evidence gate and observed outcome. Material exceptions flow into the remediation budget, transaction protections and valuation case.

24. Control false positives

Measure incorrect matches, detections and escalations by cohort and condition.

The controlled record includes scope; version; population; condition; device; metric; source; reviewer; decision. The immediate deliverable is a false-action assessment. Preserve jurisdiction, effective date, model and software version, test population, capture conditions, device configuration, reviewer, approval and unresolved exceptions.

The principal failure occurs when operational burden and customer harm are ignored. Reviewers should reproduce the relevant tests, segment the result, examine tail outcomes and identify who may approve, remediate or withhold the transaction recommendation.

A buyer can connect robustness evidence to market access, customer retention, remediation cost, contractual protection and valuation scenarios.

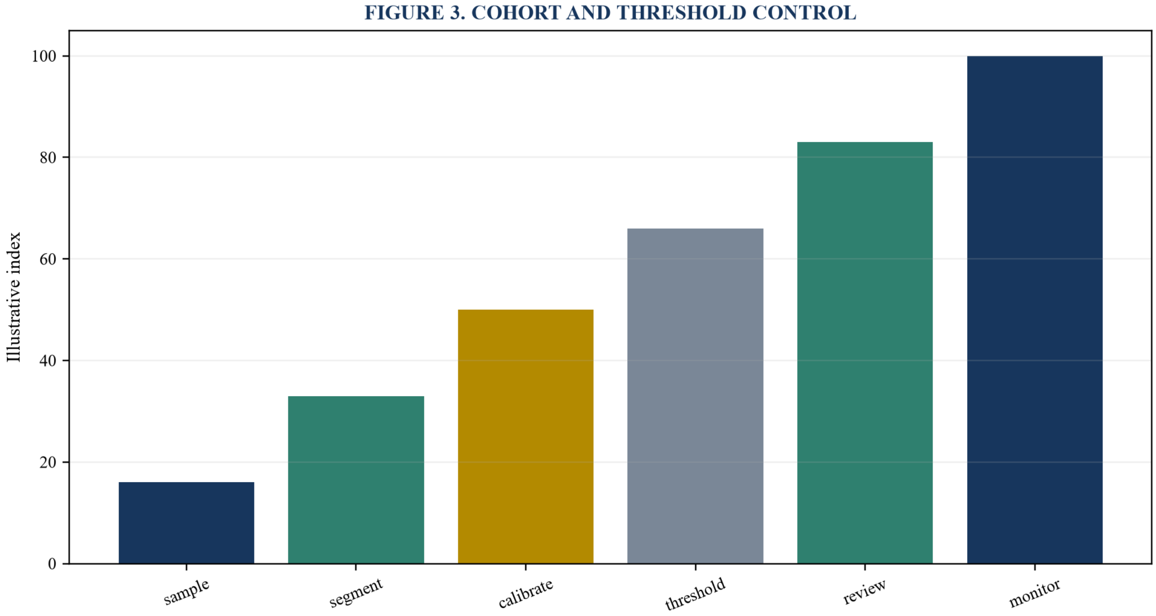
The decision pack for control false positives should show the prior claim, tested evidence, correction, commercial consequence, alternative response, owner, due date, next evidence gate and observed outcome. Material exceptions flow into the remediation budget, transaction protections and valuation case.

Table 3. Cohort error controls

Control	Primary measure	Decision use
coverage	sample and confidence	evidence sufficiency
dispersion	error by cohort	market exposure
threshold	trade-off curve	operating policy
review	override and appeal	residual risk

Illustrative controls require use-, population-, condition-, device-, jurisdiction- and period-specific approval.

Figure 3. Cohort and threshold control



Values are illustrative indices and require replacement with approved diligence evidence.

25. Calibrate confidence

Relate model scores to observed error by cohort, condition, device and version.

The controlled record includes scope; version; population; condition; device; metric; source; reviewer; decision. The immediate deliverable is a calibration dossier. Preserve jurisdiction, effective date, model and software version, test population, capture conditions, device configuration, reviewer, approval and unresolved exceptions.

The principal failure occurs when confidence is mistaken for probability of correctness. Reviewers should reproduce the relevant tests, segment the result, examine tail outcomes and identify who may approve, remediate or withhold the transaction recommendation.

Computer-vision diligence should test the complete deployed system across the people, environments, hardware and release channels that support the investment thesis.

The decision pack for calibrate confidence should show the prior claim, tested evidence, correction, commercial consequence, alternative response, owner, due date, next evidence gate and observed outcome. Material exceptions flow into the remediation budget, transaction protections and valuation case.

26. Set threshold policy

Tie thresholds to use case, consequence, cohort evidence and human review.

The controlled record includes scope; version; population; condition; device; metric; source; reviewer; decision. The immediate deliverable is a controlled threshold matrix. Preserve jurisdiction, effective date, model and software version, test population, capture conditions, device configuration, reviewer, approval and unresolved exceptions.

The principal failure occurs when one threshold creates hidden cross-market trade-offs. Reviewers should reproduce the relevant tests, segment the result, examine tail outcomes and identify who may approve, remediate or withhold the transaction recommendation.

Averages are weak transaction evidence when failures concentrate in specific cohorts, devices, capture conditions or market deployments.

The decision pack for set threshold policy should show the prior claim, tested evidence, correction, commercial consequence, alternative response, owner, due date, next evidence gate and observed outcome. Material exceptions flow into the remediation budget, transaction protections and valuation case.

27. Test robustness perturbations

Apply realistic noise, blur, illumination, crop, compression and sensor perturbations.

The controlled record includes scope; version; population; condition; device; metric; source; reviewer; decision. The immediate deliverable is a perturbation sensitivity report. Preserve jurisdiction, effective date, model and software version, test population, capture conditions, device configuration, reviewer, approval and unresolved exceptions.

The principal failure occurs when small input changes produce unstable decisions. Reviewers should reproduce the relevant tests, segment the result, examine tail outcomes and identify who may approve, remediate or withhold the transaction recommendation.

The diligence record should preserve reproducible inputs, versioned outputs, uncertainty, exceptions, reviewer authority and the financial consequence of each gap.

The decision pack for test robustness perturbations should show the prior claim, tested evidence, correction, commercial consequence, alternative response, owner, due date, next evidence gate and observed outcome. Material exceptions flow into the remediation budget, transaction protections and valuation case.

28. Measure domain shift

Compare training, validation, pilot and production distributions over time.

The controlled record includes scope; version; population; condition; device; metric; source; reviewer; decision. The immediate deliverable is a domain-shift register. Preserve jurisdiction, effective date, model and software version, test population, capture conditions, device configuration, reviewer, approval and unresolved exceptions.

The principal failure occurs when historical validation is treated as permanent evidence. Reviewers should reproduce the relevant tests, segment the result, examine tail outcomes and identify who may approve, remediate or withhold the transaction recommendation.

A buyer can connect robustness evidence to market access, customer retention, remediation cost, contractual protection and valuation scenarios.

The decision pack for measure domain shift should show the prior claim, tested evidence, correction, commercial consequence, alternative response, owner, due date, next evidence gate and observed outcome. Material exceptions flow into the remediation budget, transaction protections and valuation case.

29. Test presentation attacks

Evaluate spoofing, replay, masks, screens, printouts and relevant adversarial conditions.

The controlled record includes scope; version; population; condition; device; metric; source; reviewer; decision. The immediate deliverable is an attack-resistance assessment. Preserve jurisdiction, effective date, model and software version, test population, capture conditions, device configuration, reviewer, approval and unresolved exceptions.

The principal failure occurs when commercial controls fail under motivated misuse. Reviewers should reproduce the relevant tests, segment the result, examine tail outcomes and identify who may approve, remediate or withhold the transaction recommendation.

Computer-vision diligence should test the complete deployed system across the people, environments, hardware and release channels that support the investment thesis.

The decision pack for test presentation attacks should show the prior claim, tested evidence, correction, commercial consequence, alternative response, owner, due date, next evidence gate and observed outcome. Material exceptions flow into the remediation budget, transaction protections and valuation case.

30. Quantify performance dispersion

Report central tendency, tails, confidence intervals and minimum viable cohort evidence.

The controlled record includes scope; version; population; condition; device; metric; source; reviewer; decision. The immediate deliverable is a dispersion scorecard. Preserve jurisdiction, effective date, model and software version, test population, capture conditions, device configuration, reviewer, approval and unresolved exceptions.

The principal failure occurs when aggregate scores conceal unequal and uncertain outcomes. Reviewers should reproduce the relevant tests, segment the result, examine tail outcomes and identify who may approve, remediate or withhold the transaction recommendation.

Averages are weak transaction evidence when failures concentrate in specific cohorts, devices, capture conditions or market deployments.

The decision pack for quantify performance dispersion should show the prior claim, tested evidence, correction, commercial consequence, alternative response, owner, due date, next evidence gate and observed outcome. Material exceptions flow into the remediation budget, transaction protections and valuation case.

31. Review the human workflow

Test operator attention, escalation, override, appeal and recovery under realistic workload.

The controlled record includes scope; version; population; condition; device; metric; source; reviewer; decision. The immediate deliverable is a human-control assessment. Preserve jurisdiction, effective date, model and software version, test population, capture conditions, device configuration, reviewer, approval and unresolved exceptions.

The principal failure occurs when human review is assumed to repair model failure. Reviewers should reproduce the relevant tests, segment the result, examine tail outcomes and identify who may approve, remediate or withhold the transaction recommendation.

The diligence record should preserve reproducible inputs, versioned outputs, uncertainty, exceptions, reviewer authority and the financial consequence of each gap.

The decision pack for review the human workflow should show the prior claim, tested evidence, correction, commercial consequence, alternative response, owner, due date, next evidence gate and observed outcome. Material exceptions flow into the remediation budget, transaction protections and valuation case.

32. Review system integration

Trace APIs, queues, databases, identity resolution, logging and downstream decisions.

The controlled record includes scope; version; population; condition; device; metric; source; reviewer; decision. The immediate deliverable is an end-to-end control map. Preserve jurisdiction, effective date, model and software version, test population, capture conditions, device configuration, reviewer, approval and unresolved exceptions.

The principal failure occurs when the model passes while the integrated product fails. Reviewers should reproduce the relevant tests, segment the result, examine tail outcomes and identify who may approve, remediate or withhold the transaction recommendation.

A buyer can connect robustness evidence to market access, customer retention, remediation cost, contractual protection and valuation scenarios.

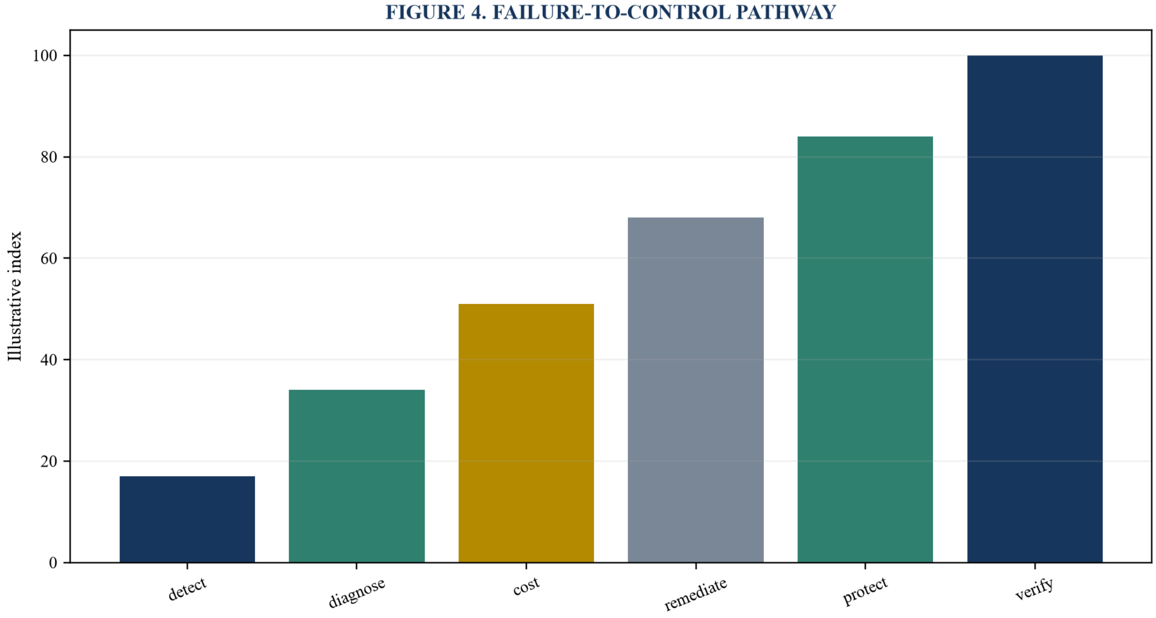
The decision pack for review system integration should show the prior claim, tested evidence, correction, commercial consequence, alternative response, owner, due date, next evidence gate and observed outcome. Material exceptions flow into the remediation budget, transaction protections and valuation case.

Table 4. Failure heat map

Failure area	Potential consequence	Required response
demographic	exclusion and claims	data and threshold remedy
lighting	operational misses	capture control
device	channel inconsistency	hardware qualification
release	silent regression	version gate

Illustrative controls require use-, population-, condition-, device-, jurisdiction- and period-specific approval.

Figure 4. Failure-to-control pathway



Values are illustrative indices and require replacement with approved diligence evidence.

33. Measure compute and latency

Test throughput, memory, energy, network dependence and response time by device.

The controlled record includes scope; version; population; condition; device; metric; source; reviewer; decision. The immediate deliverable is a performance-cost frontier. Preserve jurisdiction, effective date, model and software version, test population, capture conditions, device configuration, reviewer, approval and unresolved exceptions.

The principal failure occurs when robustness improvements destroy unit economics or service levels. Reviewers should reproduce the relevant tests, segment the result, examine tail outcomes and identify who may approve, remediate or withhold the transaction recommendation.

Computer-vision diligence should test the complete deployed system across the people, environments, hardware and release channels that support the investment thesis.

The decision pack for measure compute and latency should show the prior claim, tested evidence, correction, commercial consequence, alternative response, owner, due date, next evidence gate and observed outcome. Material exceptions flow into the remediation budget, transaction protections and valuation case.

34. Design production monitoring

Track cohort, condition, device, drift, exceptions, overrides and complaints.

The controlled record includes scope; version; population; condition; device; metric; source; reviewer; decision. The immediate deliverable is a monitoring and alert design. Preserve jurisdiction, effective date, model and software version, test population, capture conditions, device configuration, reviewer, approval and unresolved exceptions.

The principal failure occurs when post-close deterioration remains invisible. Reviewers should reproduce the relevant tests, segment the result, examine tail outcomes and identify who may approve, remediate or withhold the transaction recommendation.

Averages are weak transaction evidence when failures concentrate in specific cohorts, devices, capture conditions or market deployments.

The decision pack for design production monitoring should show the prior claim, tested evidence, correction, commercial consequence, alternative response, owner, due date, next evidence gate and observed outcome. Material exceptions flow into the remediation budget, transaction protections and valuation case.

35. Control suppliers and versions

Assess third-party models, datasets, camera vendors, licences, changes and exit rights.

The controlled record includes scope; version; population; condition; device; metric; source; reviewer; decision. The immediate deliverable is a supplier and change-control file. Preserve jurisdiction, effective date, model and software version, test population, capture conditions, device configuration, reviewer, approval and unresolved exceptions.

The principal failure occurs when an upstream change invalidates the investment thesis. Reviewers should reproduce the relevant tests, segment the result, examine tail outcomes and identify who may approve, remediate or withhold the transaction recommendation.

The diligence record should preserve reproducible inputs, versioned outputs, uncertainty, exceptions, reviewer authority and the financial consequence of each gap.

The decision pack for control suppliers and versions should show the prior claim, tested evidence, correction, commercial consequence, alternative response, owner, due date, next evidence gate and observed outcome. Material exceptions flow into the remediation budget, transaction protections and valuation case.

36. Map regulatory and contractual exposure

Connect intended use to AI, privacy, biometric, product, equality and customer obligations.

The controlled record includes scope; version; population; condition; device; metric; source; reviewer; decision. The immediate deliverable is a jurisdictional exposure map. Preserve jurisdiction, effective date, model and software version, test population, capture conditions, device configuration, reviewer, approval and unresolved exceptions.

The principal failure occurs when compliance cost and deployment restrictions are omitted from valuation. Reviewers should reproduce the relevant tests, segment the result, examine tail outcomes and identify who may approve, remediate or withhold the transaction recommendation.

A buyer can connect robustness evidence to market access, customer retention, remediation cost, contractual protection and valuation scenarios.

The decision pack for map regulatory and contractual exposure should show the prior claim, tested evidence, correction, commercial consequence, alternative response, owner, due date, next evidence gate and observed outcome. Material exceptions flow into the remediation budget, transaction protections and valuation case.

37. Cost the remediation plan

Estimate data, engineering, hardware, governance, validation and customer migration work.

The controlled record includes scope; version; population; condition; device; metric; source; reviewer; decision. The immediate deliverable is a costed correction roadmap. Preserve jurisdiction, effective date, model and software version, test population, capture conditions, device configuration, reviewer, approval and unresolved exceptions.

The principal failure occurs when management promises replace funded remediation. Reviewers should reproduce the relevant tests, segment the result, examine tail outcomes and identify who may approve, remediate or withhold the transaction recommendation.

Computer-vision diligence should test the complete deployed system across the people, environments, hardware and release channels that support the investment thesis.

The decision pack for cost the remediation plan should show the prior claim, tested evidence, correction, commercial consequence, alternative response, owner, due date, next evidence gate and observed outcome. Material exceptions flow into the remediation budget, transaction protections and valuation case.

38. Test commercial scalability

Connect robustness to win rates, churn, claims, support burden, pricing and market access.

The controlled record includes scope; version; population; condition; device; metric; source; reviewer; decision. The immediate deliverable is a robustness-adjusted commercial model. Preserve jurisdiction, effective date, model and software version, test population, capture conditions, device configuration, reviewer, approval and unresolved exceptions.

The principal failure occurs when technical weakness is disconnected from revenue quality. Reviewers should reproduce the relevant tests, segment the result, examine tail outcomes and identify who may approve, remediate or withhold the transaction recommendation.

Averages are weak transaction evidence when failures concentrate in specific cohorts, devices, capture conditions or market deployments.

The decision pack for test commercial scalability should show the prior claim, tested evidence, correction, commercial consequence, alternative response, owner, due date, next evidence gate and observed outcome. Material exceptions flow into the remediation budget, transaction protections and valuation case.

39. Adjust valuation and protections

Translate evidence gaps into scenarios, holdbacks, warranties, indemnities, covenants and price.

The controlled record includes scope; version; population; condition; device; metric; source; reviewer; decision. The immediate deliverable is a valuation and protection schedule. Preserve jurisdiction, effective date, model and software version, test population, capture conditions, device configuration, reviewer, approval and unresolved exceptions.

The principal failure occurs when identified risk has no transaction consequence. Reviewers should reproduce the relevant tests, segment the result, examine tail outcomes and identify who may approve, remediate or withhold the transaction recommendation.

The diligence record should preserve reproducible inputs, versioned outputs, uncertainty, exceptions, reviewer authority and the financial consequence of each gap.

The decision pack for adjust valuation and protections should show the prior claim, tested evidence, correction, commercial consequence, alternative response, owner, due date, next evidence gate and observed outcome. Material exceptions flow into the remediation budget, transaction protections and valuation case.

40. Close through deal gates

Require evidence, owners, remediation funding, contractual protection and post-close monitoring.

The controlled record includes scope; version; population; condition; device; metric; source; reviewer; decision. The immediate deliverable is an accountable investment decision. Preserve jurisdiction, effective date, model and software version, test population, capture conditions, device configuration, reviewer, approval and unresolved exceptions.

The principal failure occurs when deal momentum overrides unresolved robustness risk. Reviewers should reproduce the relevant tests, segment the result, examine tail outcomes and identify who may approve, remediate or withhold the transaction recommendation.

A buyer can connect robustness evidence to market access, customer retention, remediation cost, contractual protection and valuation scenarios.

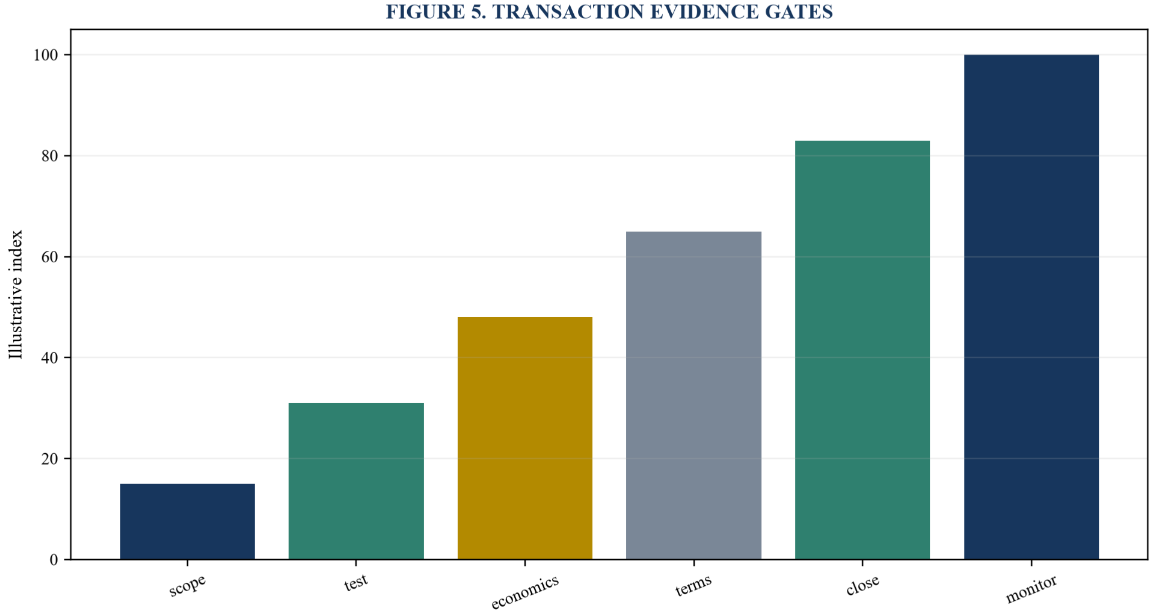
The decision pack for close through deal gates should show the prior claim, tested evidence, correction, commercial consequence, alternative response, owner, due date, next evidence gate and observed outcome. Material exceptions flow into the remediation budget, transaction protections and valuation case.

Table 5. Valuation and deal gates

Gate	Primary work	Completion evidence
evidence	reproducible segmented tests	approved benchmark
economics	remediation and unit cost	funded plan
protection	warranties and holdbacks	executed terms
monitoring	post-close thresholds	accountable owner

Illustrative controls require use-, population-, condition-, device-, jurisdiction- and period-specific approval.

Figure 5. Transaction evidence gates



Values are illustrative indices and require replacement with approved diligence evidence.

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Chennakeshav (CK) is a corporate finance and investment banking executive with 25+ years of global experience in deal origination, structuring and execution across M&A, growth capital and corporate strategy. He has led value-creation mandates for founders, corporates and funds — bridging the boardroom view to hands-on execution and close.

His career spans Morgan Stanley, HSBC, Lloyds Banking Group, EWEC, ADQ portfolio companies and Emirates Growth Fund, across TMT, real estate, fintech, deeptech, cleantech, infrastructure and energy. He has partnered with C-suite leaders, private equity and venture funds, sovereign wealth funds and family offices to finance complex fund raises and scale-up ventures, and has led M&A due diligence, post-merger integration and business-transformation initiatives to create value.

At Matchpoint Partners he is Managing Partner, leading the firm's corporate finance, M&A and capital-raising practice. He holds an MBA from London Business School, an engineering degree from VTU and a Master of Laws (LLM, in progress) from UCL London.

An active start-up mentor, CK mentors at Techstars, DIFC FinTech Hive, Startup Grind, Founder Institute and IN5, serves as Entrepreneur Mentor in Residence (EMiR) at London Business School, and judges the Entrepreneurship World Cup.