

The Vision AI Center of Excellence Blueprint

A playbook for turning vision AI into
an owned, scalable capability

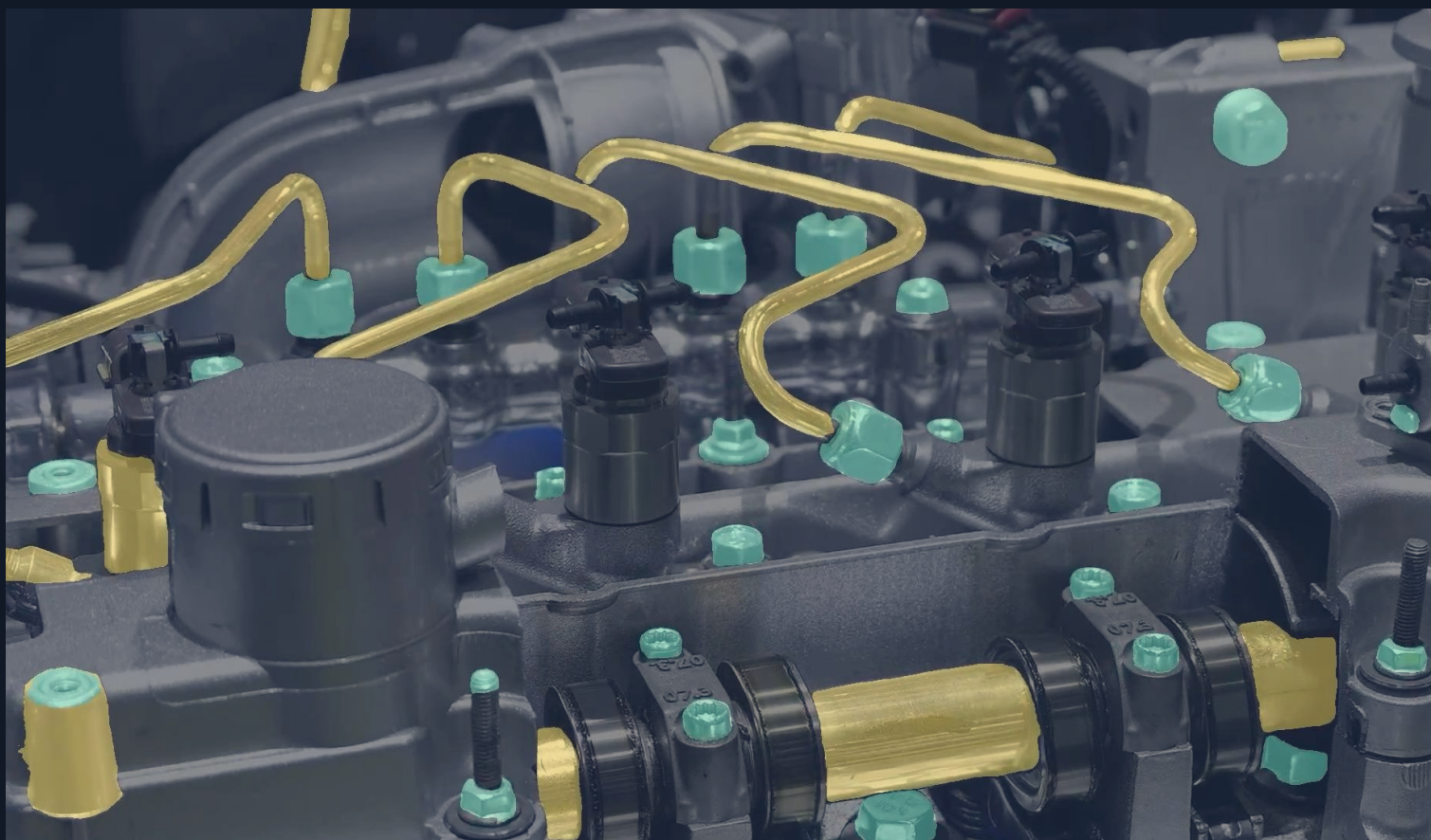


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Most industrial enterprises will spend three years stuck in vision AI pilots.

They will run twelve to twenty-four use cases, scale two, and quietly write off the rest. The ones that escape pilot purgatory will do it the same way they have escaped every previous wave of operational technology: by building a Center of Excellence that owns the capability rather than renting it from a vendor.

This blueprint is a working playbook for that build. It is written for anyone who is being asked to triple production with the same headcount, who has a portfolio of proofs of concept that have not converted to production, and who needs an operating model that compounds rather than one that depends on the vendor's roadmap.

A Vision Center of Excellence converts one-off pilots into a Standard Solution Catalog that plants pull from on demand. It is built around three universal roles, Builder, Scaler, and Operator, that mirror the lifecycle of every solution from zero to scale. And the right vendor relationship runs in reverse of the typical SaaS curve: vendor effort and cost-per-deployment fall every quarter while internal capacity rises.

The operative phrase is **owned, not rented**. The companies that will win in the next decade of AI will be the ones whose capability lives inside their own org chart.

What this blueprint gives you

- **A Standard Solution Catalog framework**
Six artifacts every catalog entry ships with.
- **A three-role operating model**
Builder, Scaler, Operator - staffed by you, by your vendor, or hybrid.
- **A five-level Maturity Model**
From Evaluation to Standardized Edge, with the trap at each level.
- **A 10-question diagnostic**
Tells you in one sitting whether your program is on the curve.

The Industrial Vision Gap

Vision AI is the only practical answer to a problem most industrial enterprises now face. Production targets are climbing. Quality requirements are tightening. Workforces are not growing in step. Every operations leader inside an industrial enterprise can name the bottleneck: the human-in-the-loop inspection, classification, and exception steps that throttle throughput and quality at the same time.

Manual processes are linear. AI-based inspection is not.

Why Most Programs Never Reach the Operator

Many enterprise AI projects do not deliver measurable business value, and only **26 percent** of organizations that consider themselves advanced in AI implementation report successfully delivering AI use cases. In computer vision specifically, the gap is wider, because vision adds two failure modes that language AI does not have: the model has to survive the floor (vibration, lighting drift, dust, network outages), and the deliverable is not a detection but a workflow that an operator on the floor will actually trust.

Four reasons vision programs stall

Each plant treats its problem as unique

The misalignment problem at one plant is treated as separate from the misalignment problem from another plant, even though the defect patterns are identical.

The model survives the lab but not the floor

Reference accuracy of 96 percent in clean conditions becomes 71 percent under real lighting, and the program is quietly shelved.

The vendor relationship is built around projects, not catalogs

Each new use case is a new statement of work. Internal capability never compounds.

The operator on the floor never sees value

Detections get logged to a dashboard. The HMI moment, the workflow that gets triggered, the decision that gets automated, never arrives.

Why a CoE is the Answer that Scales

The Push Trap

The instinct, when a CTO sees vision AI working in one plant, is to push the same solution to the rest of the network from headquarters. This rarely works. Plants reject what they did not specify. Local engineering teams have legitimate concerns about hardware compatibility, line speeds, and product variation. The mandate stalls in implementation reviews and dies a quiet death.

The three alternatives are all worse.

DIY at every plant

Duplicated work, no shared learning, no governance. Three years in: 40 deployments, 40 model registries, 40 monitoring stacks, zero cross-site visibility.

Single full-service vendor

Fast in year one and locked in by year three. Internal capability never develops. The cost-per-deployment curve never bends.

Pure platform, no services

High ceiling, low floor. Programs stall at the first edge case because there is nobody whose job it is to get them unstuck.

The Pull Model

The Center of Excellence flips the dynamic. HQ does not push. HQ runs a vetted **Standard Solution Catalog** and the plants pull from it. The catalog is the load-bearing artifact of the entire operating model. When the catalog is small or unproven, plants ignore it. When the catalog earns trust, plants stop building bespoke solutions and start asking what is in it.

A catalog entry is not a model. It is a packaged combination of:

- A trained model with documented accuracy thresholds.
- An inference pipeline configured for the target hardware.
- An HMI pattern (the operator-facing decision).
- An integration template (PLC, SCADA, MES, ERP).
- A deployment runbook.
- Acceptance criteria the receiving site can test against.

When a plant pulls a catalog entry, they get all six. The site engineer's job is to adapt the integration to local variation, not to rebuild the solution from scratch.

The Autonomy Curve

Cost-Per-Deployment Falls Over Time

A good vendor relationship in vision AI should look like the inverse of a typical SaaS curve. Vendor effort and cost-per-deployment should fall over time. Internal capacity and catalog ownership should rise. If your vendor's revenue model requires them to grow inside your stack year over year, you do not have a CoE partner; you have a long-term professional services contract dressed up as a partnership.

Phases of a High Performing CoE



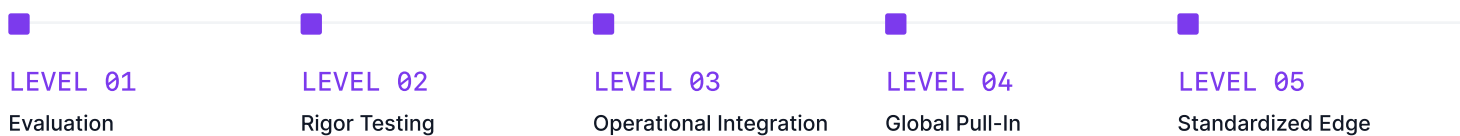
The economic shape is what matters. Cost-per-deployment compounds downward. Catalog size compounds upward. The two curves cross somewhere in year two, and that is the inflection where the CoE pays for itself.

Using Partners to Accelerate Time-to-Production

[Roboflow](#)'s commercial structure is built to align with this curve, not to fight it. The vendor relationship begins with **Forward Deployed Engineers** who design the first catalog entries with the customer's team. As the catalog matures, **Implementation Engineers** help the customer scale catalog entries across sites and build internal deployment playbooks. Once the customer is running the catalog independently, **Named Technical Support Engineers** provide ongoing stability and observability.

The CoE Maturity Model

A Vision CoE matures through five levels. Each level has an unlock and a trap. The fastest-moving programs in this space treat the model as a self-assessment, not a roadmap, because most enterprises are operating at different levels in different parts of their portfolio simultaneously.



LEVEL 01

Evaluation

Definition

Prove applicability on three to five candidate use cases.

Unlock

A small portfolio of validated POCs, each tied to a documented business case.

Trap

Confusing a working POC with a deployable solution. A POC clears a controlled bar. A deployable solution clears the floor.

LEVEL 02

Rigor Testing

Definition

Graduate from the lab to the floor.

Unlock

Real-world performance under vibration, lighting drift, dust, network outages, and operator behavior. The model does not have to be perfect. Internal Roboflow research on production models showed that even a 50 percent accurate defect detector still creates roughly \$2.5 million in cost avoidance on 100,000 defects at \$50 per defect. The threshold is whether the system survives the environment, not whether it is perfect.

Trap

Skipping environmental validation and discovering it in production after the operations team has lost trust.

LEVEL 03

Operational Integration

Definition

Build the Inspection Blueprint, the architecture pattern that defines what a deployable catalog entry looks like.

Unlock

A repeatable architecture (model, pipeline, HMI, integration) that any plant can pull and adapt.

Trap

Every site building bespoke integrations because the blueprint was not standardized early enough.

LEVEL 04

Global Pull-In

Definition

Plants deploy from the catalog with site-specific customization.

Unlock

Time-to-value measured in weeks, not quarters.

Trap

Catalog drift, where local forks proliferate without governance and the catalog quietly stops being a catalog.

LEVEL 05

Standardized Edge

Definition

Global parity across complex regions, including data-sovereignty and connectivity-constrained sites.

Unlock

A single operating model worldwide. New sites onboard in days, not months.

Trap

Treating Level 5 as a destination rather than a steady state. The catalog has to keep evolving.

The CoE Engine: Build, Scale, Operate

A Vision CoE is only as strong as the people who power it. The Resource Model that follows is built around three universal archetypes that any mature CoE needs, regardless of vendor.

The Three Archetypes



THE BUILDER

Takes ideas from zero to one. Pairs with innovation and engineering leaders inside the customer.

Mission

Turns a candidate use case into a hardened catalog entry that has cleared rigor testing.

Posture

Change-forward, signaling product gaps and emerging use cases back to the platform team.



THE SCALER

Takes catalog entries from one to many. Pairs with site engineers, plant managers, and ops.

Mission

Deploy catalog entries across plants with site-specific adaptation, and build the deployment playbooks for scale.

Posture

The Scaler's success metric is how quickly they can hand a catalog entry off to the plant's own team.



THE OPERATOR

Keeps the deployed system trusted. Pairs with site owners, ML engineers, and ops leadership.




Mission

Stability, observability, runbooks, and the long-term health of the catalog in production.

Posture

Stability-first. The Operator is the reason a CoE is still trusted by the floor in year three.

How Roboflow Operationalizes the Three Roles

Archetype	Roboflow role	What they do
 The Builder	Forward Deployed Engineer (FDE)	Designs and builds high-value customer solutions, taking ideas from zero to one. Performs deep embedded discovery to expand the catalog with high-impact entries.
 The Scaler	Implementation Engineer (IE)	Scales validated solutions from one to many by deploying across sites and adapting to plant variations. Creates reusable deployment playbooks. Involvement tapers as the customer gains autonomy.
 The Operator	Named Technical Support Engineer (nTSE)	Owens stability, reliability, and long-term health of the deployed solution. Creates support playbooks and the customer-specific knowledge base.

The Success Triangle as the Metric Framework

A CoE is measured against three outcomes that ensure the technology actually reaches the floor.

Speed to implement

Median time from intake to live inference. The Discovery, Prototype, and Pilot phases of a catalog deployment should compress from a quarter or longer in early year one to weeks by mid year two.

Successful implementation

Percentage of catalog deployments that meet acceptance criteria on first attempt. This is the metric that tells you whether the catalog is real.

Workforce upskilling

Percentage of plants with at least one certified internal CoE practitioner. This is the metric that tells you whether the Autonomy Curve is bending.

If you already staff a Builder role inside a broader AI CoE, the question is not whether to add headcount — it is whether your existing Builders have **vision-specific muscle**: dataset curation, edge inference selection, environmental rigor testing, HMI design.

Two tests: ask them to defend a model architecture choice for a Jetson Orin Nano, and to walk through validating a model under three different lighting conditions.

Building the Vision CoE Charter

This is what the first stages of building your CoE looks like.

STEP 01

Define

- **Pick the North Star metric.** The two defaults are median time from intake to live inference and cost-per-deployment trend. Pick one. Commit to reporting it monthly from day 31 forward.
 - **Identify three candidate use cases** spanning easy, medium, and hard. The easy one is the proof. The medium one is the pilot. The hard one stays in the backlog.
 - **Name an executive sponsor and a working group** – a Builder counterpart from the vendor, an internal engineering lead from the candidate plant, and an operations leader who can speak for the floor.
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STEP 02

Pilot

- **Take the easiest use case through Maturity Levels 1 and 2** with vendor support. The point is not to ship the most impressive solution — it is to test the operating model where technical risk is low.
 - **Define the catalog entry shape** using the Inspection Blueprint pattern. What are the six artifacts you ship? What does the HMI connection look like? What are the acceptance criteria?
 - **Establish baseline measurements** against the Success Triangle: Speed, Implementation success, Upskilling.
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STEP 03

Codify

- **Promote the first solution into a v0 catalog.** One entry, end to end, with all six artifacts. This becomes the template every future entry is measured against.
- **Stand up the Builder, Scaler, and Operator role assignments.** Internal, vendor, or hybrid. Most CoEs in their first year are 70–80% vendor-staffed; by year two, the ratio inverts.
- **Schedule the first quarterly portfolio review.** Set the year-one target for the Autonomy Curve: what percentage of deployments will be plant-led by month 12.

From Renting Vision AI to Owning It

Most vision AI vendors sell fish. The Autonomy Curve is what makes that promise structural rather than rhetorical. A vendor whose business depends on building every solution for you has a different incentive than a vendor whose business depends on the catalog growing under its own power.

Public Proof Points

The companies that are furthest down this curve are the ones whose vision investments have already crossed the inflection.

BNSF

20% inventory accuracy gain

Across 32,500 route miles, on edge hardware that supports the network without internet connectivity.

"Achieving positive results using AI in a lab environment is easy; the real challenge is scaling across a network like ours without disrupting day-to-day operations." - Asim Ghanchi, AVP of Technology, BNSF

USG

Vision AI across 50 manufacturing sites

Edge inference survives internet outages; a centralized dashboard connects distributed teams.

Lou Stocco's framing - that the production metrics initiate human-to-human conversations between facilities that previously did not exist - is the cultural shift that compounds for a decade.

ULTEIG

AI prediction replaces costly hardware

Engineering firm monitors cloud cover to optimize utility-scale solar operations

"Vision AI can also assist with mundane, repetitive tasks, freeing our engineers to focus on more critical work and deliver better outcomes to our clients." - Jeff Steinhaus, Associate Director of Software Engineering, Ulteig

DIAGNOSTIC

A 10-question Check for the CoE Operating Committee

Ten yes/no questions the CTO and the working group can answer in one sitting.

Do we have a Standard Solution Catalog with at least one entry, or are we still operating one project at a time?

Has any catalog entry been deployed at more than one site?

Do we have named Builder, Scaler, and Operator owners for the program (internal, vendor, or hybrid)?

Have we agreed on a North Star metric and committed to reporting it monthly?

Do we have a written Inspection Blueprint pattern that any future catalog entry will follow?

Have we tested at least one model under real-world environmental conditions (lighting drift, vibration, network outage)?

Can a plant initiate a catalog deployment without HQ approval?

Does our vendor's commercial model reward our internal contribution to the catalog or penalize it?

Do we have a definition of done that gates promotion into the catalog?

Do we run weekly intake, monthly catalog hygiene, and quarterly portfolio reviews?

HOW TO READ YOUR SCORE

6 or more "yes" answers means the program is on the curve. **3 to 5** means a CoE is forming but not yet operating. **2 or fewer** means the program is in pilot purgatory regardless of how many use cases are in flight.

Vision AI is Operational Infrastructure Today

Roboflow now processes **55 billion** visual AI predictions per year, **more than half the Fortune 100** runs computer vision in production on the platform, and **over 1 million engineers** have built on it.

55B

Visual AI predictions processed per year on Roboflow.

50%+

Of the Fortune 100 run computer vision on the platform.

1M+

Engineers have built on Roboflow.

Vision AI is no longer a future technology. It is operational infrastructure today, and the question is whether your operating model is ready to own it.

THE NEXT MOVE

Book a 45-minute Vision CoE **Strategy Session**

We'll map your current state to the maturity model, identify your three highest-impact candidate use cases, and build a CoE charter you can take to your operating committee.

[Schedule a session](#)

or contact via sales@roboflow.com



Vision AI is bridging the gap between physical and digital worlds. **Let's see how it transforms your organization.**

[Contact us](#)

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