Proven Framework:
Drive Real ROI From AI

95% of AI projects fail. See how the 5% succeed.

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TABLE OF CONTENTS

Driving business growth with vision AI

In the AI era, technology leaders are expected to lead business growth

The rise of AI solutions is putting immense pressure on technology teams. A significant majority of CEOs believe AI will be the most impactful technology in their industry,[1] and organizations that successfully implemented AI reported higher efficiency gains than their peers.[2] These high expectations mean the demand for tangible value from AI investments has never been greater.

However, the path to success isn't always obvious. According to a survey of organizations that classify themselves as advanced in AI implementation, only 26% reported successfully delivering AI use cases.[3] This leaves us with a complex question to consider: In the nascent AI landscape, how can technology teams ensure their vision AI initiatives translate into positive, measurable business outcomes?

This guide aims to answer that question. Drawing on real-world case studies and insights from helping over half the Fortune 500 implement AI projects, we share proven strategies to succeed. You'll learn how top organizations identify high-value AI use cases, plan for implementation, and use the technology as a catalyst for growth.

How vision AI delivers business results

Technology leaders across industries are implementing vision AI and impacting their organizations' bottom line.

90% less time on inventory management

By recognizing intermodal containers and automatically updating yard inventory.

$10 million in cost reductions

By identifying defects earlier in the manufacturing process and avoiding reworks.

40% fewer claims and return requests

By automatically inspecting products and ensuring customers receive the correct items.

Part 1: Identifying high-value use cases for vision AI

This chapter provides a framework for taking inventory of where vision AI can be implemented in your organization and how to prioritize the opportunities that offer the highest return on investment.

Cataloging workflows at your business

Successful technology adoption begins with a clear business objective. The first step is to create a catalog of your organization's operations and tasks, as below:

- **Review key business units.** Work through your business from beginning to end, listing the key functions and business units.
- **List impactful operations and tasks.** Engage the teams responsible for these areas and ask them to document the specific operations that are central to their work and the overall success of the company.

After following the above steps, you should have a catalog of the most important operations and tasks in each business unit. This catalog will serve as the foundation for subsequent prioritization and might look like this:

Business Unit 1	Business Unit 2	Business Unit 3
List the top operations impacting success of this unit:	List the top operations impacting success of this unit:	List the top operations impacting success of this unit:
1. _____	1. _____	1. _____
2. _____	2. _____	2. _____
3. _____	3. _____	3. _____

By following this approach, you'll have a comprehensive starting point for selecting the vision AI use cases that truly matter.

EXAMPLE

Cataloging business operations at a manufacturer

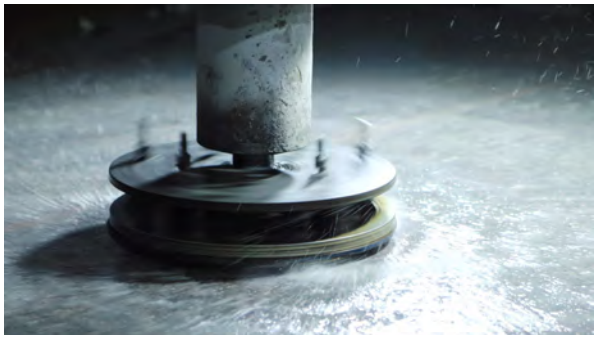
Here is an example of cataloging different areas and key operations that impact the performance of a manufacturing firm.

1 Raw material

Evaluate and store raw materials.

Operations:

- [ ] Evaluate raw material quality
- [ ] Update material stock levels
- [ ] Forecast material usage



2 Manufacturing

Turn raw materials into finished products.

Operations:

- [ ] Measure cycle time
- [ ] Monitor equipment wear and tear
- [ ] Identify jams and bottlenecks

3 Quality control

Inspect the quality of finished products.

Operations:

- [ ] Identify imperfections and damage
- [ ] Check adherence to specifications
- [ ] Detect missing items or components

4 Distribution

Store and deliver products to customers.

Operations:

- [ ] Pick and pack orders
- [ ] Verify the condition of cartons
- [ ] Scan shipping labels

Assessing if a use case is suitable for vision AI

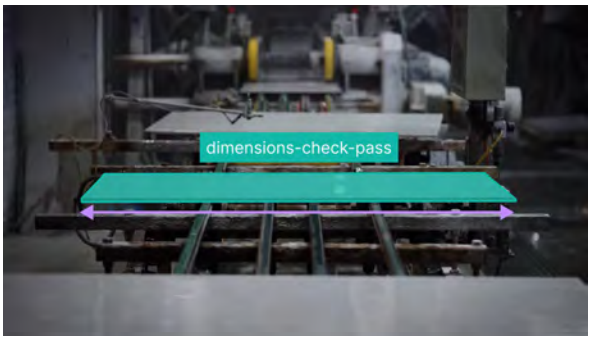
With your catalog of business operations in hand, the next step is to evaluate which ones are the best fit for vision AI. The below table includes attributes commonly found in successful AI use cases.

Attribute	Example use cases
✓ **Volume and velocity** Does the process occur at a speed or scale that makes it difficult for humans to handle? Vision AI is capable of processing massive amounts of data at high speed.	○ Inspecting thousands of products per minute on an assembly line. ○ Analyzing a large set of satellite images for infrastructure projects planning. ○ Processing hundreds of hours of broadcast footage to find when specific brands and logos appeared.
✓ **Actionability** Does the visual information lead to a subsequent action or decision? AI can quickly interpret data and trigger an improved or automated business process.	○ Triggering an alarm when product defects are identified. ○ Logging the condition of cartons in a warehouse for claims processing. ○ Starting and stopping machinery when anomalies are detected.
✓ **Subjectivity and consistency** Is the current process prone to human variability, subjectivity, or error? AI can provide a more objective and consistent assessment, reducing errors and improving quality.	○ Classifying product quality attributes according to a consistent standard. ○ Verifying the correct placement and assembly of components. ○ Reviewing medical imagery to identify subtle anomalies.
✓ **Feasibility and safety** Does the process require visual observations in an environment that is unsafe or inaccessible for humans? AI enables monitoring and analysis in conditions where humans cannot operate.	○ Verifying the alignment of products in a high-temperature furnace. ○ Detecting jammed items within machinery and tight spaces. ○ Monitoring the condition of rail wheels during operation.

EXAMPLE

Attributes of successful vision AI use cases

Below are examples of common use cases along with notes about the attributes making them suitable for AI



Use case: Verifying product specifications

Evaluate the quality, dimensions, and color consistency to verify adherence to standards.

- **Volume:** Thousands of products are manufactured and inspected each day.
- **Actionability:** Alerts for products with incorrect specifications.
- **Subjectivity:** High; differentiating between specifications like color and texture are subjective.

Use case: Automating warehouse inventory

Recognize various SKUs in warehouses and automatically update inventory levels.

- **Volume:** Items representing hundreds of SKUs are reviewed and logged multiple times per day.
- **Actionability:** Automatically generate a restock order when low inventory is detected.
- **Subjectivity:** Medium; while SKUs are clearly marked, human-driven scanning can lead to missed items and data entry errors.

Use case: Inspecting critical infrastructure

Inspect the condition of equipment and proactively schedule maintenance to avoid safety issues.

- **Volume:** The integrity of hundreds of miles of pipeline is inspected regularly.
- **Actionability:** Record GPS coordinates and trigger alerts when wear or damage is detected.
- **Subjectivity:** High; assessing conditions (e.g., rust, wear, or cracks) requires a consistent benchmark that humans may apply unevenly.

Determining the strategic value of AI use cases

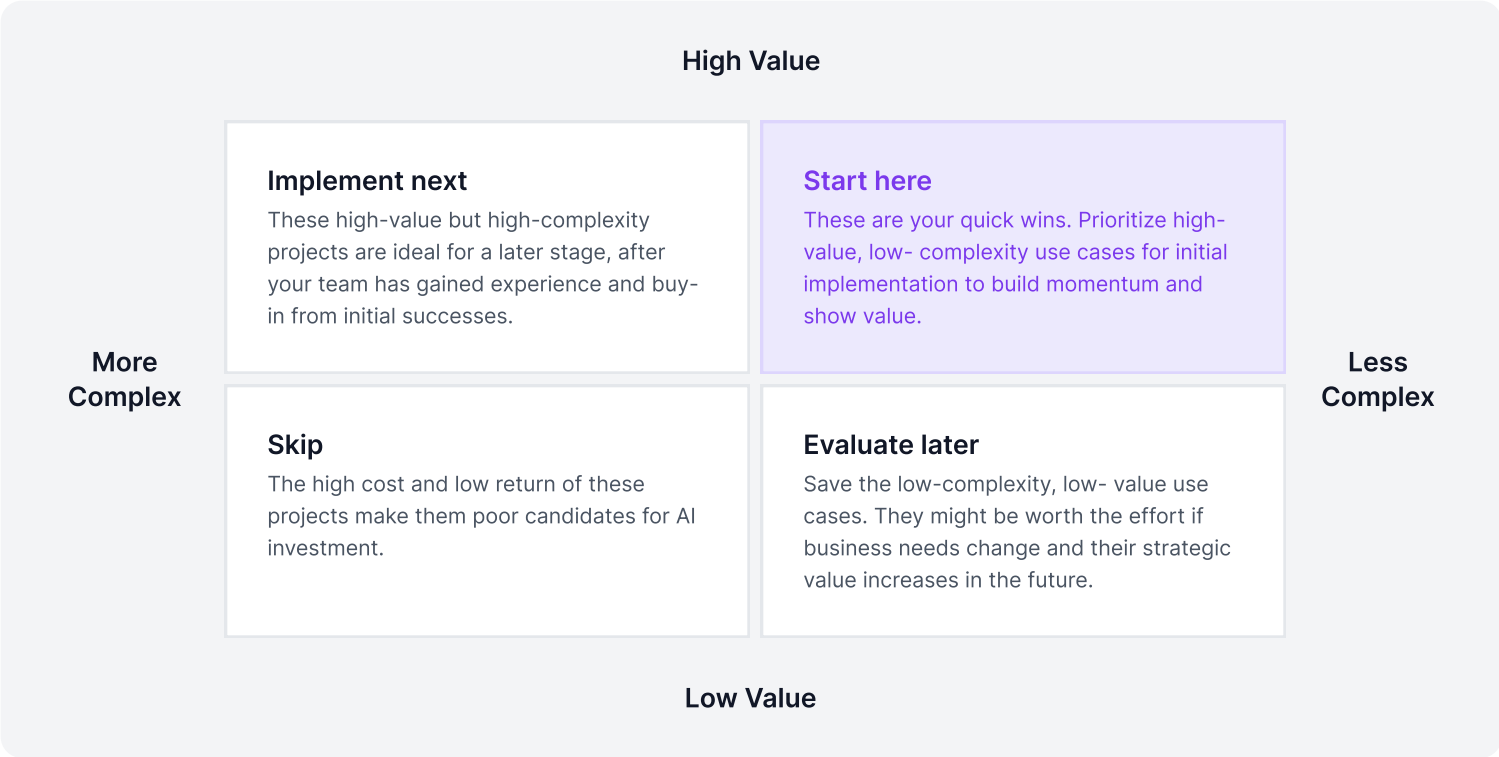
With a clear understanding of what makes a good vision AI use case, the next step is to evaluate each use case based on the strategic value they can deliver. Organizations that implement vision AI often see value created in the areas below.

Strategic value	Examples
Enhanced efficiency Vision AI streamlines operations by automating tasks and providing real-time insights that were previously impossible to obtain.	**Task automation** Free up human teams to focus on high-value projects **Process optimization** Increase output by identifying and alleviating bottlenecks **Predictive maintenance** Avoid downtime by proactively maintaining equipment
Improved quality By providing objective analysis, AI elevates quality control standards, reducing errors and ensuring consistent results.	**Defect reduction** Reduce the number of defects that reach end customers **Enhanced accuracy** Remove human error from tasks like inventory management **Adherence to standards** Ensure standards in quality control and process execution
Reduced costs AI impacts financial and environmental sustainability by minimizing waste, preventing expensive errors, and optimizing resource usage.	**Early issue detection** Avoid costly manufacturing reworks **Error prevention** Decrease claims by ensuring customers get correct items **Waste reduction** Eliminate waste by correcting faulty machinery in real time
Increased revenue By automating processes that were previously unfeasible or unprofitable, AI creates new opportunities for products and services.	**Delivering new products** Launch new services or products by automating processes that previously were not feasible **Opening new markets** Enter a new market by using vision AI to perform a task that was previously too complex or costly to execute

Prioritizing the high-value, low-complexity use cases

The most successful AI journeys begin with strategic wins. By focusing on use cases that deliver significant business value with fewer implementation challenges, your organization can build momentum and demonstrate early success.

Prioritization matrix: Selecting use cases for vision AI



Benefits of prioritizing high-value, low-complexity use cases

This approach yields several key benefits:

1

Faster time to value

By focusing on less complex projects to implement, you accelerate deployment and deliver a faster return on investment.

2

Improved internal buy-in

Early successes build confidence among stake- holders and secure the support needed for future, more ambitious initiatives.

3

Skills development

Simpler use cases enable teams to develop skills and increase the likelihood of success on more complex projects in the future.

Defining Value and Complexity

To effectively use the prioritization matrix on the previous page, you must first define the criteria for value and complexity. Here are a few key factors to consider:

Value

Below are categories to consider when evaluating the value of use cases.

Direct

Focus on immediate, quantifiable benefits such as reduced operational expenses through automation, increased sales, or new direct revenue streams.

Indirect

Qualitative benefits that improve the business indirectly, such as data- driven insights to optimize processes, fostering innovation, or enhancing customer satisfaction.

Indirect

This involves forecasting future growth, establishing a sustainable competitive advantage, enabling expansion into new markets, and ultimately outperforming competitors.

Complexity

Below are common factors to consider when ranking the complexity of a vision use case.

Infrastructure

Do new cameras need to be installed to capture the imagery? What computing resources are required to run the model in the desired environment?

Modeling

How complicated is the visual analysis task? Can existing AI models solve the problem or would a custom model need to be developed?

Data readiness

If a custom model is required, does your team have access to high- quality training data that is reflective of the production environment?

Establishing clear goals and success metrics

Before integrating a new visual AI system, it's crucial to have a clear understanding of what success looks like. Defining a clear success metric before a project begins ensures you can articulate the business challenge, achieve internal alignment, and make informed decisions throughout the entire process.

Defining goals with the V.I.S.U.A.L. framework

Use the below framework when defining the goals and success criteria of a vision AI project.

Guideline	Description	Example
Verifiable	The project's success must be directly tied to a **visually verifiable objective** – something the AI model can see and measure.	The AI model will inspect products moving along an assembly line and identify surface imperfections, incorrect dimensions, and color accuracy.
Impact	The solution must have a specific and measurable **business impact**, such as reducing costs or improving safety.	The project aims to reduce the number of product defects reaching the end customer by 40%, saving the company an estimated $5,000,000 in rework and support costs.
Scale	Define the **scale** of the use case. This might include the number of images to process, the speed of analysis, and the number of sites.	The AI must process 50 images per minute across three different manufacturing sites, totaling over 2 million images per month.
Usable	The solution must satisfy specific **usability** criteria. This could include defining a target for accuracy, latency, or reliability.	To reach the stated defect reduction goal, the system would need to catch at least 64% of defects on the line.
Actionable	Define the specific **actions** that should be triggered or executed based on the AI output.	When the AI detects a defect, the solution must trigger an alert for the operator, log the event in a SQL database, and issue a command to a PLC to halt or redirect the item on the assembly line for additional inspection.
Lifecycle	The project should have a plan for its **lifecycle**, with timely goals for each phase.	The project will include multiple phases. First, a prototype will be tested within 30 days of the start date. Upon success of the test, the solution will go into full production within 90 days.

Case study: Elevating quality standards at the largest maker of drywall

As the largest manufacturer of gypsum products in North America, USG leveraged vision AI to improve efficiency and quality standards within their network of 50 manufacturing sites.

Avoiding production downtime

During the drywall production process, USG needed to identify products that were misaligned as they moved down the line. Previously, when a misaligned product went unnoticed, it might jam machinery resulting in hours of downtime, cleanup time, and costs from damaged items.

To avoid these jams, USG used Roboflow to develop a purpose-built, edge-ready vision AI system to continuously monitor drywall boards and evaluate size and angle of each. The system is integrated with industrial machinery, automatically rerouting products or pausing the line when an issue is detected.

Establishing objective quality benchmarks

USG also deployed a custom AI system to improve the consistency of quality standards across their network of facilities. In the past, technicians needed to evaluate the quality of drywall boards based on their observations, which resulted in varying quality standards across sites and technicians.

The vision AI solution now assists technicians with objective quality evaluations, helping teams at each site maintain consistent standards and improve customer satisfaction.

USG products at Chicago O'Hare International Airport

USG Sheetrock brand drywall products

"With the AI-powered system we built with Roboflow, we established accurate quality benchmarks. This allowed us to pinpoint the characteristics that define the best drywall product and enabled our team to shift from subjective judgment calls to actively elevating quality consistency."

Lou Stocco Director of Manufacturing, Advanced Analytics, USG

Part 2: Designing your vision AI solution

Now that you've identified a high-value use case, the next step is to design a solution that works. This chapter will guide you through the technical journey, from selecting the right vision model and developing custom AI, to integrating it with your existing systems and choosing the optimal computing infrastructure.

Getting the right vision model

With your high-value use case in mind, the next step is to select the right vision model to power your solution. While building AI solutions once required deep machine learning expertise and significant investment, modern tools and services have dramatically lowered the barriers to developing accurate vision models for production environments. AI is increasingly in the hands of engineers, not specialized machine learning teams and R&D labs.

Choose your strategy: Pre-trained vs Custom vision models

While large, pre-trained AI models are incredibly powerful and useful for simple tasks, many organizations are deploying custom-trained, edge-ready vision models designed for specific use cases.

The decision often comes down to choosing between a readily available pre-trained model or a custom-trained model built for your specific needs. Here's a quick comparison:

Feature	Pre-trained Models	Custom Models
Accuracy	Ideal for general tasks: Less accurate for specialized, industrial use cases.	Ideal for industry-specific tasks: Can be tuned for precision use cases.
Latency	Potential for latency when using larger models or cloud-based APIs.	Performance can be optimized for real-time, low-latency edge deployments.
Typical Use Cases	Image classification or detection of common objects, scanning text in documents, prototyping solutions.	Automating industrial processes, like quality control, inventory management, specialized image analysis, or robotic guidance.

Model development: From human-driven to AI-driven

Traditional model development was a slow, human-driven process. Teams spent significant time manually labeling thousands of images before they could even begin training a model.

Modern development tools have flipped this workflow, allowing AI to assist in the labeling process and reducing the burden on human labellers. Increasingly, you can provide a small amount of context to an AI model, which in turn assists with the initial labeling work. Human teams only need to review and approve the AI-generated labels, dramatically accelerating the process and freeing up valuable time.

● Human labelled ● AI labelled

1

Training data

Prepare the initial sample data for model training.

2

Initial context

Provide the initial context, like a prompt or a few labels.

3

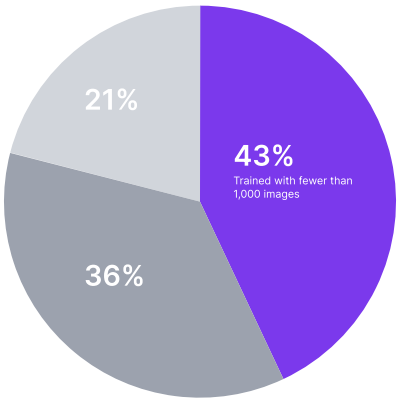
AI labelling

Have a model or agent label the remaining training data.

Train with less data: Small models solve big challenges

A common misconception is that you need tens of thousands of labeled images to build an accurate model. Modern computer vision platforms and pre-trained models have fundamentally changed this.

According to our **research**, a significant portion of production-ready models are trained on small datasets. 43% of the models we sampled were trained on datasets with fewer than 1,000 sample images. This data demonstrates that you can achieve production-ready accuracy without the massive, time-consuming effort of manually labeling a huge dataset.



Train accurate models with fewer images

Almost half of the models with high accuracy scores were trained using less than 1,000 images.

- Less than 1,000 images in training set
- 1,001 to 10,000 images in training set
- Over 10,001 images in training set

Based on 635 models developed for enterprise usage with accuracy scores over 85%

Model accuracy: Not every use case needs perfect accuracy

While striving for high accuracy is a natural goal, it's a misconception that a vision AI model must be 100% accurate to deliver significant value. In many real-world scenarios, a model that is "good enough" can still dramatically improve operations and profitability.

The table below shows how a model with a 50% success rate still delivers significant benefits. In manufacturing, where many product defects might go unnoticed, catching half of the flaws can still create millions of dollars in value.

Defects	Cost per defect	Success rate	Defects identified	Cost avoided
100,000	$50	50%	50,000	**$2,500,000**
100,000	$50	60%	60,000	**$3,000,000**
100,000	$50	70%	70,000	**$3,500,000**
100,000	$50	80%	80,000	**$4,000,000**
100,000	$50	90%	90,000	**$4,500,000**

Solving complex problems with a multi-model approach

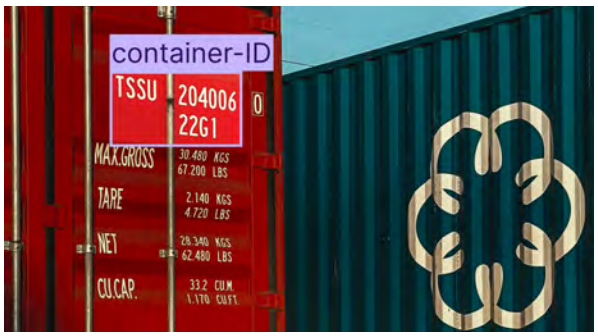
For workloads where you need to identify hundreds of unique objects or comprehend complex scenes, training one model may be suboptimal. By combining multiple AI models, you can create precise solutions for tough challenges, while simplifying development and enabling faster adaptation to changing needs.

For example: A single, all-purpose model might struggle to accurately extract text from an image of a freight container, leading to noisy and incorrect data. A multi-model approach, however, enables greater precision. The first model can be trained to identify and isolate the specific region containing the ID number, while a second model can then focus on accurately extracting just the text from that defined area.

1

Raw visual input

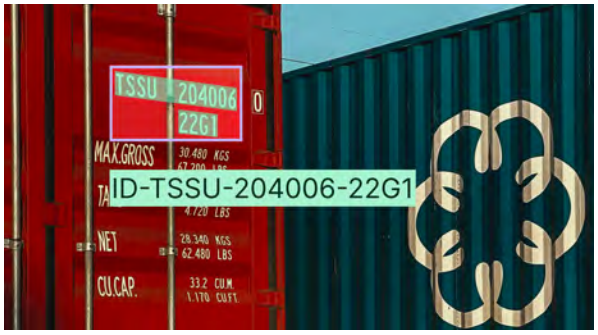
Images and video often include extraneous information



2

Model 1: Identify the area

Use an object detection model to pinpoint the area to process



3

Model 2: Perform analysis

Use a second model to extract information from that area only

Choosing infrastructure: Edge, cloud, hybrid

Once you have a model ready, the next question is “how do I run it in my production facility or facilities?” We call this process “deployment.” Selecting the right infrastructure for running your system is a foundational decision that impacts performance, cost, and scalability. Below are common considerations when planning vision AI projects.

Deciding your deployment strategy

Use the following table to compare the core considerations when choosing between an edge, cloud, or hybrid deployment.

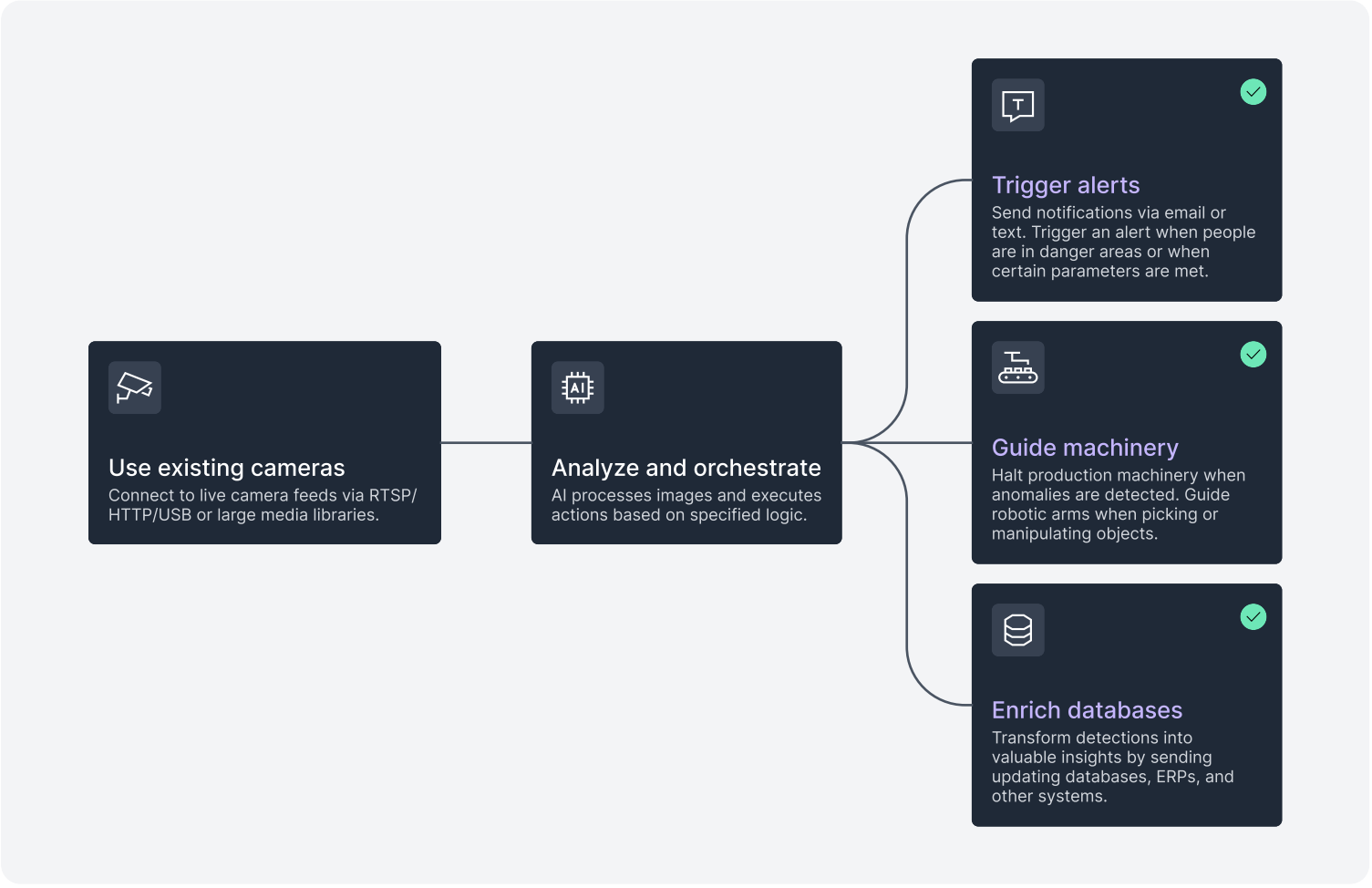
Guideline	Choose Edge When...	Choose Cloud When...	Hybrid Considerations
Latency	Real-time processing is critical (e.g., quality control, automation, safety).	Low latency is not a strict requirement; batch processing is acceptable.	Edge for immediate processing, cloud for background analysis.
Computing Power	Models can run efficiently on constrained edge hardware.	Models require larger computing resources or workloads fluctuate.	Edge for inference, cloud for model training and complex analytics.
Network Connectivity	Solution must function in remote or secure facilities without connectivity.	Consistent, stable internet access is available.	Edge for offline use cases, cloud for remote and fluctuating usage.
Management Complexity	Expertise for managing hardware and software updates is available.	Simplified management and maintenance is a priority.	Use resources for critical offline tasks, simplify management of cloud tasks.
Data Privacy	Strict regulations or policies restrict data transmission off-device.	Data aggregation and centralized analysis are a key priority.	Process sensitive data locally; anonymous in a secure cloud.
Costs	More upfront investment; Less data transfers and cloud usage may lower long-term costs.	Less upfront investment; ongoing services costs may be higher based on actual usage.	Optimize costs by performing high-volume tasks at the edge; cloud for select workloads.

Unlocking value with integration and automation

A vision AI model's true value is realized when its insights are connected to your existing systems. By integrating the AI's output with your operational workflows, you can automate critical tasks, enrich data, and create a truly intelligent enterprise at scale.

Example: Orchestrating intelligent actions with vision AI and videos

The real power of vision AI comes from its ability to orchestrate actions in a business workflow. In the chart below, a model analyzes a live video feed or image. The output from the model can trigger a variety of automated responses based on your business logic.



FLETCHER
NEP Broadcast Services

Case study: AI-controlled cameras enhance broadcasts at Wimbledon and the US Open

Fletcher has specialized in high-end cameras for live sports for over 25 years. Recognizing an opportunity to innovate, Fletcher integrated vision AI into its systems to automatically track fast-moving players and identify key actions, enhancing its broadcast solutions.

AI-Powered Camera Automation

During the Wimbledon and US Open tournaments, Fletcher deployed an AI-powered system that automatically tracked players across multiple simultaneous live feeds. This solution made it possible to provide full-court coverage for the first time, managing 56 cameras across 14 courts at the US Open from a single operations center.

Edge Deployment for High-Speed, Low-Latency Performance

This system runs on local devices without internet connectivity, which is crucial for keeping up with the fast-paced action of live sports. The AI solution, developed with Roboflow, analyzes multiple video streams at high speeds, demonstrating the power of an edge deployment to meet the low-latency requirements of modern broadcast production.

AI tracking a player on the court

Operations center managing 56 live camera feeds

“We knew AI would take our camera automation solutions to a whole new level. Roboflow accommodated our needs related to real-time operation, frame-rate, and latency. This helps Fletcher improve the viewing experience for millions worldwide.”

Dwayne Pallanti Director of Engineering, Fletcher

Part 3: Going from prototype to production

With your vision AI solution designed, the final challenge is to successfully deploy it and ensure it delivers real business value. This chapter explores the key factors for a successful rollout, emphasizing the iterative and phased implementation strategies that maximize your chances of success.

The pillars of successful AI implementation

A successful AI project depends on three pillars:

People

All stakeholders essential for the project's success: the project lead, users who will interact with the technology, and executives.

Processes

The plan to take the project from discovery to scaled adoption, including communication, feedback loops, and internal training.

Technology

The core capabilities of the technology: its ability to meet project goals, real-world performance, and long-term viability and support.

SURVEY

People and processes are key factors in successful AI rollout

A recent survey of professionals with AI experience revealed that the success of a project depends more on people and processes than technology. Four of the top five factors they cited focused on training, phased rollout, and integration planning.

This highlights the importance of strong organizational buy-in and effective project management. Moving from a prototype to production solution requires a holistic approach that prepares the entire organization for change.

Top 5 factors that contributed to successful AI adoption

1. Access to high-quality, well-structured data
2. Successful change management and internal training
3. Well-planned integration with existing systems and processes
4. Dedicated implementation team or project lead
5. Gradual, phrased rollout

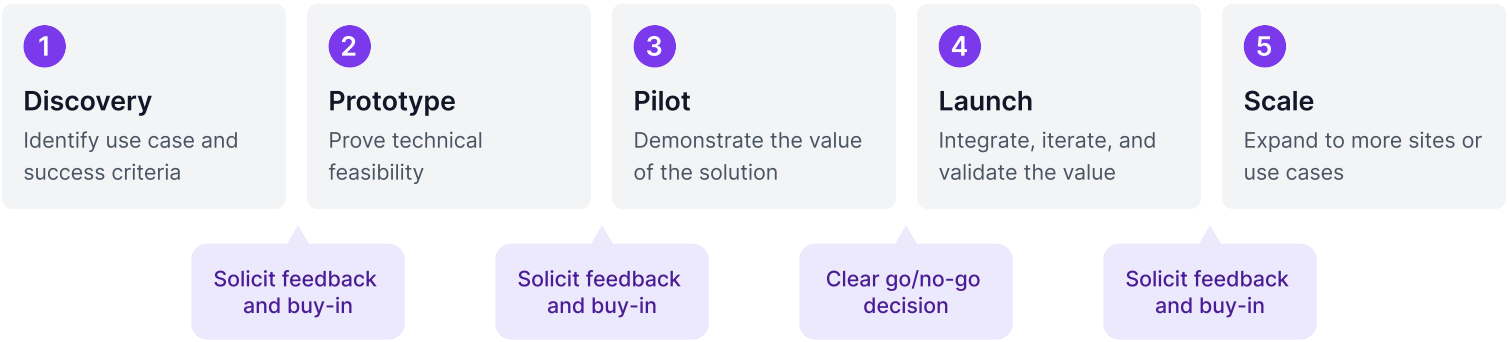
Building momentum and buy-in with a phased rollout

A successful AI project concludes with a fully adopted solution that delivers consistent business value. The most effective way to achieve this is through a phased rollout, which manages risk and secures internal buy-in. This iterative approach breaks the deployment into manageable stages, with each step designed for continuous feedback and refinement.

The phased rollout ensures you stay aligned with your goals. By establishing clear success metrics during the Discovery phase – such as reduced downtime, improved accuracy, or increased throughput – each subsequent stage becomes an opportunity to validate the project's business impact. This step-by-step process of validation proves the solution's value and justifies further investment.

Building a continuous feedback loop among stakeholders

Effective teams ensure success by regularly soliciting feedback from end-users, communicating the project's status and projected impact, and using these insights to refine the solution. This continuous feedback and buy-in loop is what transforms a pilot into a scalable, enterprise-wide solution.



Preparing your team for change

As the project moves from prototype to pilot and launch, providing internal training becomes paramount. Training should not only cover how to use the new technology but also explain how it will improve workflows, enhance safety, or free up time for higher-value tasks. This proactive approach helps teams embrace the new technology as an asset, not an obstacle, and enables them to contribute to making the system better over time.

Key steps for a smooth pilot and beyond

A successful rollout is the result of careful planning. Before you launch your pilot, proactively address these critical factors to ensure a smooth transition from prototype to production.

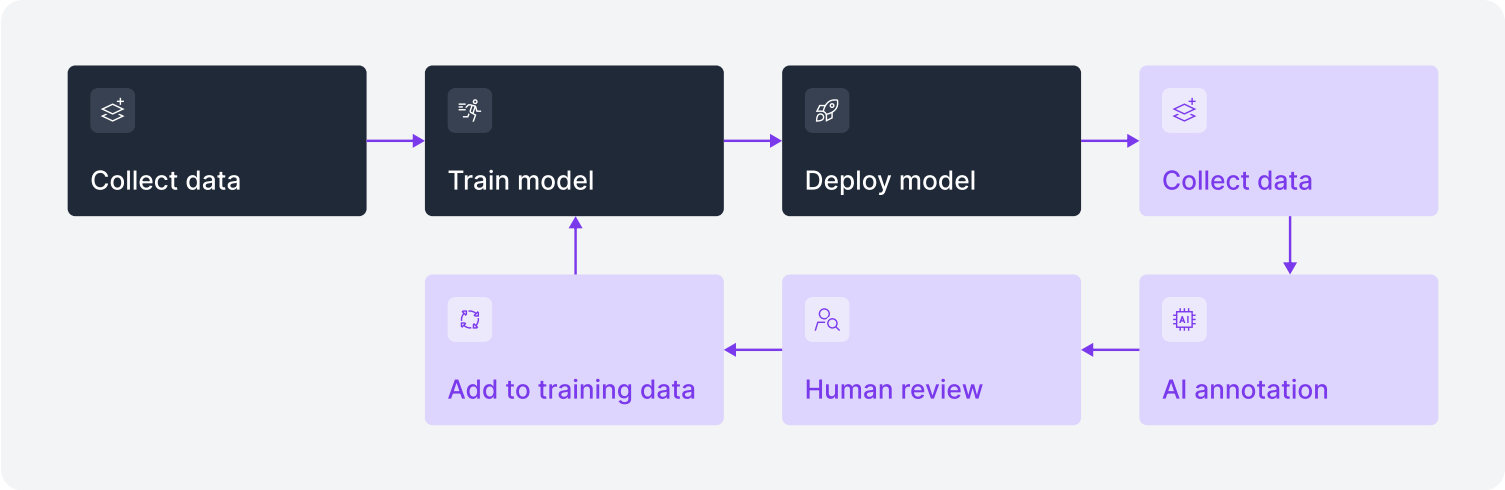
Factor	Description	Example tasks
Core capabilities	Detail the requirements of your vision AI solution, from camera input to output, and map these to vendor offerings. When procuring a third-party solution, ensure it can satisfy requirements for AI development, integration, automation, support for deployment infrastructure, and future scalability.	☐ Research platforms and vendors based on core vision AI capabilities ☐ Prioritize vendors with end-to-end development and deployment tools ☐ Verify the edge, cloud, and hybrid capabilities of vendors ☐ Make sure vendors can satisfy future scaling requirements
Compliance and risk	Prevent costly delays by addressing legal and compliance hurdles early. Before starting your project, engage legal and IT security teams to review policies on data privacy, intellectual property, and system security.	☐ Review existing data privacy policies (e.g., GDPR, CCPA). ☐ Schedule a legal review of the project's IP and liability. ☐ Define security protocols for the AI system and required approvals.
Communication and Buy-In	A successful rollout hinges on frequent communication and stakeholder alignment. Use the pilot phase as a crucial checkpoint for a 'go/no-go' decision, backed by a clear document or presentation that highlights success metrics, value delivered, and next steps.	☐ Draft a project overview for executive stakeholders. ☐ Hold a kickoff meeting with all relevant teams. ☐ Create a pilot success metrics dashboard. ☐ Schedule a "go/no-go" review meeting after the pilot.
Change Management	A well-planned change management strategy is vital. Clearly communicate how the technology benefits daily work, improves safety, or automates monotonous tasks. Involve teams in the feedback process to ensure the solution is both effective and user-friendly.	☐ Develop an internal training module for the AI solution. ☐ Conduct a workshop on how the technology improves workflows. ☐ Establish a feedback channel (e.g., survey, email alias, or messaging channel). ☐ Identify and empower an "AI champion" within relevant teams.

Adopt an iterative approach: Start small, improve over time

Model training doesn’t stop after the pilot or initial launch. A core strength of modern vision AI is its ability to adapt and improve over time.

As we've discussed, modern AI development has shifted from a human-driven to an AI-assisted approach. Humans now provide context and review model-assisted labeling, making a continuous, iterative workflow both feasible and highly effective.

The iterative development loop

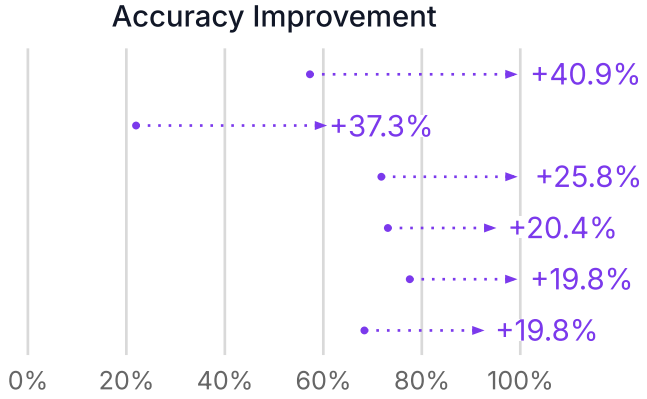


Continuous improvement drives accuracy

In our research, many organizations continually improve the accuracy of vision models. In a survey of thousands of models that were trained in Roboflow, spanning a period of six months, we found many organizations improve the accuracy of vision models by double digits. The key was continually adding to the training data set and retraining the model.

For example, one organization incrementally added 995 new images to a dataset over six months. This iterative process, which involved retraining the model 18 times, resulted in a significant accuracy improvement of 40.9 percentage points.

Model use case	Iterations	Images
Predictive maintenance	18	+995
Hazard detection	33	+2,005
Beverage seal check	17	+4,399
Production cycle time	26	+15,283
Image analysis	39	+2,406
Quality control	60	+1,0177



Based on 406 AI models used in enterprise production during the sample period.

Ultimately, an iterative approach is as much a business strategy as it is a technical one. Demonstrating continuous improvement – whether in accuracy, efficiency, or cost reduction – builds confidence among stakeholders and secures the buy-in needed to scale the project.

Case study: Enhancing safety and automating yard inventory

As one of North America's largest freight rail networks, BNSF Railway operates across 32,500 route miles and transports over 4.8 million carloads annually. Managing the vast and complex logistics of this network required a new approach to enhance both operational efficiency and safety standards.

Intermodal yard operated by BNSF

Automating inventory for a 20% accuracy increase

By developing computer vision models with Roboflow's platform for dataset optimization and hosted training, BNSF has achieved real-time inventory updates in its intermodal yards. This new system, which replaced manual checks, has led to a reported 20% increase in inventory accuracy, greatly reducing operational complexity.

> **“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. Our partnership with Roboflow is allowing us to do just that.”**
>
> **Asim Ghanchi** AVP of Technology, BNSF

Enhancing rail safety with AI-assisted asset inspection

Furthermore, these AI-powered systems are crucial for safety. They are deployed to automatically inspect train wheels at critical points, identifying potential defects and preventing costly and dangerous derailments. The use of Roboflow’s edge AI inference capabilities ensures the system can run on local devices, supporting BNSF's massive network operations.

Vision AI success roadmap: From discovery to scale

Use this roadmap as a phase-by-phase blueprint for bringing your AI project to production.

Phase	Item
Discovery 15-30 days	☐ **Use Case Selection** Define the problem, business opportunity, and align with strategic goals ☐ **Project Brief** Document the project vision, required capabilities, success metrics, and timeline. ☐ **Vendor Selection** Choose partners based on technical capability, security, scalability, and support. ☐ **Compliance, Legal, and Security Review** Understand policies, regulations, and required documentation for project approvals.
Prototype 15 days	☐ **Data Preparation** Ensure model training data is available, properly annotated, and well-structured. ☐ **Prove Technical Feasibility** Build a minimal viable prototype and conduct preliminary testing. ☐ **Internal Review & Approval** Demonstrate potential business value and get stakeholder buy-in to proceed to a pilot.
Pilot 30-60 days	☐ **Testing & Infrastructure** Run the pilot in a limited production environment with dedicated resources. ☐ **Demonstrate Business Value & ROI** Illustrate the potential value based on the pilot data. ☐ **Internal Review & Approval** Present a comprehensive report and make a go/no-go decision for launch.
Launch As needed	☐ **Initial Implementation** Roll out the solution to the first target environment. ☐ **Continued Refinement** Establish procedures for ongoing optimization ☐ **Validate Business Value & ROI** Prove a positive return on investment when using the solution in production.
Scale As needed	☐ **Process Improvements** Document best practices for future projects. ☐ **Internal Review & Approval** Approve the expansion to additional environments. ☐ **Implement in Additional Environments** Deploy the solution across the enterprise, leveraging documented best practices.

Conclusion: Unlocking new possibilities with vision AI

You've now seen the full roadmap for taking a vision AI project from concept to a successful, scaled solution. Throughout this guide, a simple but powerful truth is clear: vision AI is more than a technical tool. It's a strategic driver of business growth.

Identifying strategic use cases is critical

The most successful projects begin with a clear business need. We learned to identify high-value opportunities by looking for processes that are too fast, too complex, or too subjective for humans to handle.

Successful AI projects leverage custom, multi-model solutions

We explored how to choose between pre-trained and custom models, and how to select the right infrastructure – whether on the edge, in the cloud, or a hybrid approach – to meet your specific project needs.

Scale depends on people as much as technology

We saw that a successful rollout hinges on more than just the technology. It requires a holistic approach built on three pillars: People (change management and training), processes (iterative development and phased rollout), and technology (a robust, adaptable solution).

Next steps

The journey from prototype to production can be complex, but you don't have to navigate it alone. This guide provides the framework, but every organization's needs are unique. The best next step is to connect with an AI expert who can help you apply these principles to your specific challenge.

Validate your use case: Get expert guidance on defining and prioritizing the highest-value opportunities for your organization.

Accelerate your pilot: Work with a team that has a proven track record of successful deployments to move from idea to prototype quickly and efficiently.

Plan your full rollout: Build a phased rollout strategy that manages risk and sets your project up for long-term success.

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

Contact us

Works cited: 1) The Top CIO Challenges, According to 12k+ of Your CIO Peers, Gartner (2025); 2) How Vision AI Leaders Are Pulling Ahead In Logistics, Lumenalta (2025); 3) What Is Holding Up AI Adoption for Businesses, EPAM (2025)