HORIZONS

Operational Readiness

Operational readiness is the pinnacle of getting product to the consumer, faster.

This includes both startup and commissioning aspects, as well as additional activities that are in direct support of operational excellence and high Overall Equipment Effectiveness (OEE) outputs. Operational readiness may include, but is not limited to, process optimization, training and development, capacity analysis and ramp-up planning, takt time, and other activities intended to optimize the operational performance of a system.

Executive summary

FAST STARTS. ROUGH STARTUPS.

It may be hard to tell from that small photo below, but I've gone gray—which is to say, when it comes to project delivery for food, beverage, and consumer product manufacturers (referred to collectively as the CPG industry throughout this report), I've been around long enough to have seen many things. And if there's one thing I know for sure, it's this: Stakeholders don't remember the first 80% of a project. They remember the final 20%—the part that determines whether a project succeeds… or hits turbulence.

Under pressure like that, why do only 3% of projects reliably meet their launch deadlines? That's according to our 2025 survey of 396 CPG manufacturers from the United States, who told us what's working (and what isn't) in their approach to startup planning. This report is built on their perspective, alongside insights from our team of startup readiness experts (many of whom have walked in your shoes as former CPG manufacturers). Our goal is to help you keep your promises when it's "go time," ensuring a smooth lift-off from day one—and a cruising altitude that will carry you all the way to market dominance.

AUTHOR:

Jason Robertson, Vice President, Food + Beverage

The C-suite says “Go.”

Are you ready?

It’s mid-quarter. You’re leading a team of internal engineers at a global CPG manufacturer.

A request arrives from leadership:

“We want an increase in production for our canning speed to meet demand for a new non-alcoholic seltzer. You’ve got two months.”

“We have a ‘clean label’ reformulation for this product. Can we meet our OEE target within the first sixty days of production?”

“Our plant needs to meet our digital transformation goals by year-end. Make it happen.”

“We’re removing that SKU from the contract manufacturer and producing it in-house. Tech transfer starts next month.”

Business decisions like these are expected in today's fast-moving CPG industry, where getting to the market first with a unique SKU can generate significant market share.

However, just because they're expected doesn't make these decisions easy to execute—especially when your team has shrunk over the past few years, decreasing the pool of institutional knowledge and forcing you to achieve more with fewer resources. Meanwhile, new hires bring a fresh perspective but also introduce different problem-solving approaches. How do you move forward as an efficient, cohesive team?

I've seen this scenario play out often. Maybe it's familiar to you, too. Pressure is high, the path forward is unclear, and you find yourself making commitments that you aren't sure you can meet under the circumstances.

So, what's your strategy?

Most teams start by defining the best-case scenario—a ramp-up plan that assumes everything will go right.

But even with strong intentions and early scoping, things rarely follow the plan. In fact, according to our survey respondents, **one in three manufacturers miss their target saleable production date—*half of the time***.

If you've lived through a missed startup deadline, you know what comes next: scrambling. It's a period so familiar that it has its own nickname: **"The Dip"**—that is, the gap in production between your ideal startup and the messy reality that unfolds in the real world.

The Dip happens when a streamlined launch devolves into firefighting, caused by a mix of avoidable challenges:

✗ **TOO LITTLE TIME**
Three-quarters of survey respondents said that timeline constraints derail their operational readiness planning.

✗ **SHRINKING BUDGETS**
79% said that inflation pressures are impeding their operational readiness planning, despite most respondents allocating 1% to 3% of their budget to it.

✗ **INADEQUATE TRAINING**
Fewer than 10% of respondents rated their current training programs as "very effective," while nearly 20% said their training programs are completely ineffective.

✗ **ESCALATING COMPLEXITY**
More than 60% of respondents are investing in new automation—a challenging step change, especially given the lack of training effectiveness.

So how can you eliminate The Dip? The answer is easy to identify but tough to execute: **Invest early in a structured, phase-aligned operational readiness strategy.**

OPERATIONAL READINESS DEFINED

Operational readiness isn't about more planning—it's about planning *better* by understanding the issues that can impede the startup process and developing a structured approach to address those issues one-by-one.

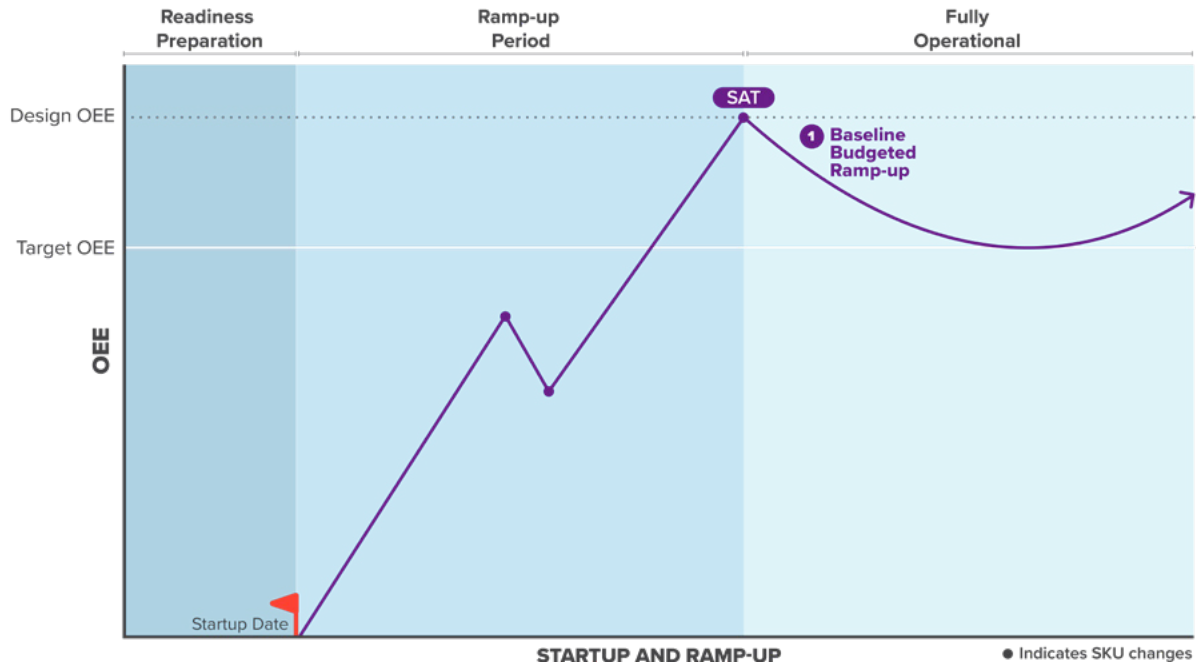
This is how we defined operational readiness to our 2025 survey participants:

> **Operational readiness is the pinnacle of getting product to the consumer, faster.**
>
> This includes both startup and commissioning aspects, as well as additional activities that are in direct support of operational excellence and high Overall Equipment Effectiveness (OEE) outputs. Operational readiness may include, but is not limited to, process optimization, training and development, capacity analysis and ramp-up planning, takt time, and other activities intended to optimize the operational performance of a system.

In our years as an integrated project delivery team, our clients have told us that **investing just 2% in upfront operational readiness planning could generate a 20% improved return during a project's first six months of operation**. That's because robust operational readiness planning results in the opposite of The Dip: **a vertical startup** that scales smoothly from "day one" production volume to maximum OEE.

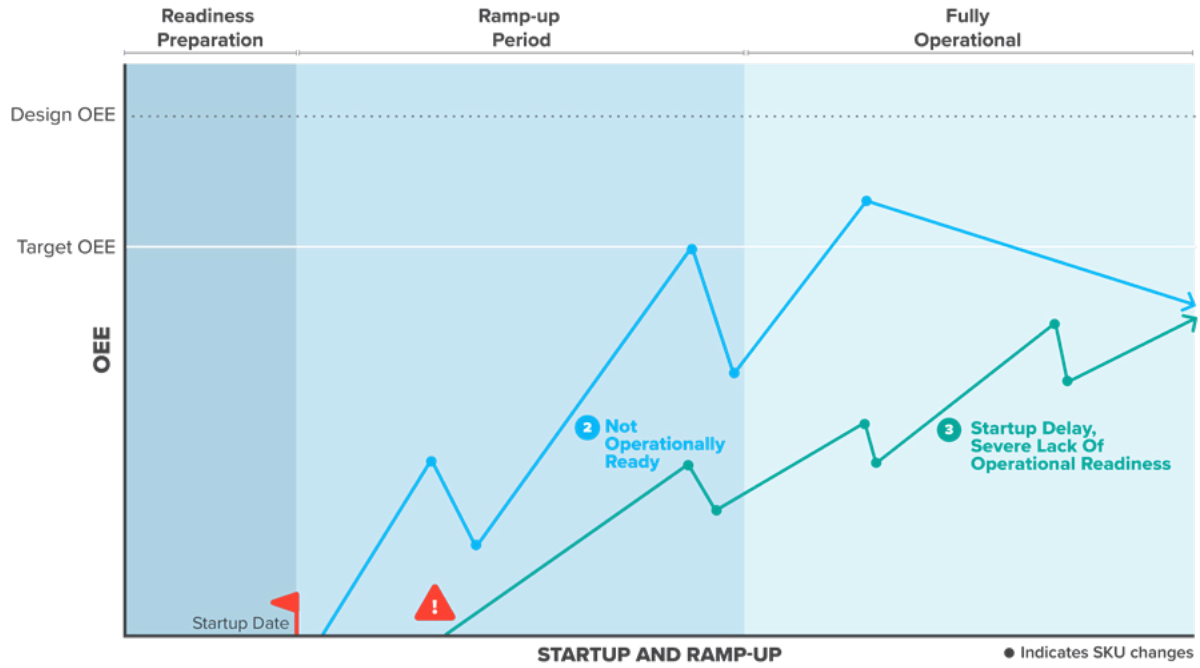
Baseline startup: Scenario 1

This idealized project curve is often used to justify ROI and secure capital approval.

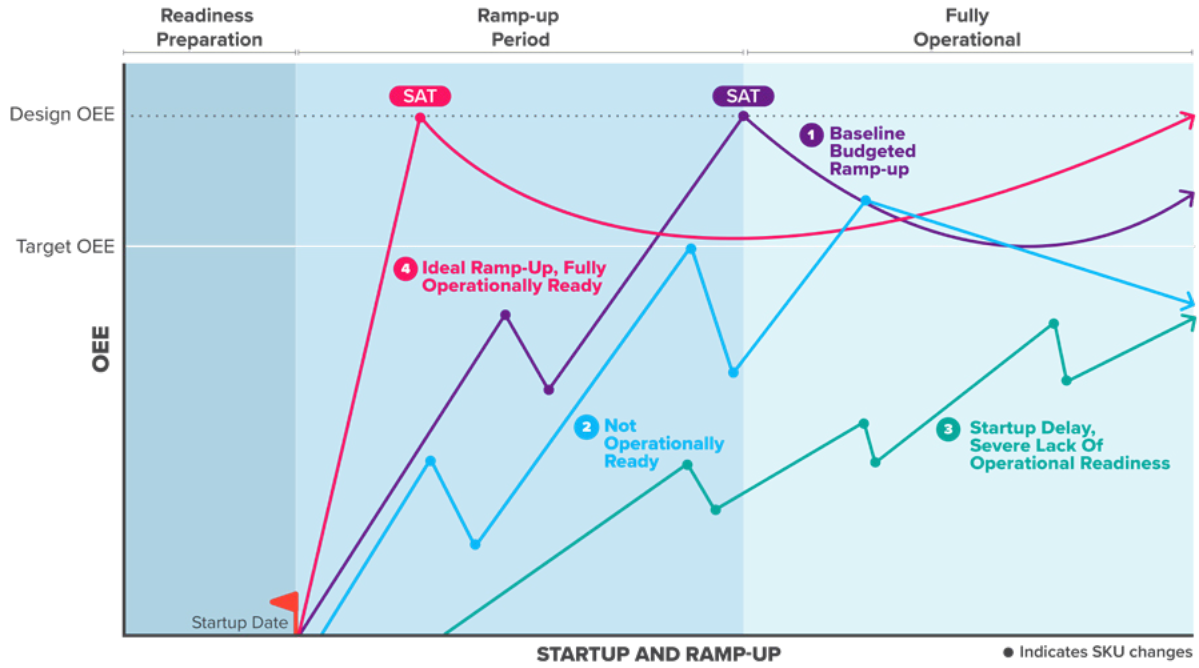


The Dip: Scenarios 2 and 3

Scheduling delays and low ramp-up volumes force projects to follow a rocky, unpredictable path.



Vertical startup: Scenario 4
When operational readiness is built in from day one, projects don't just launch—they accelerate smoothly to peak performance.



The art and science of operational readiness

Strong operational readiness strategies address four different elements: **Minds (your people), Machines (your assets), Materials (your inputs), and Methods (your processes)**. When all four elements work together, it looks like this:

- The workforce is trained thoroughly and effectively, well in advance of startup.
- The operations and maintenance teams have collaborated with original equipment manufacturers (OEMs) to develop detailed standard operating procedures (SOPs) and PM plans.
- Materials and ingredients are available at the specified quality, supported by a defined inventory strategy.
- Spare parts are on the shelf because they were budgeted for and there was a deliberate effort to ensure they were in the plant.
- Equipment is commissioned and verified against real operating requirements, not just installation specs.
- A realistic gap analysis of internal skills and bandwidth has identified where support is needed, and appropriate partners have come on board early in the delivery lifecycle.

This list could extend for several pages, which goes to show that while the concept of operational readiness may be simple, behind it lies a complex matrix of interdependent elements.

Each of these elements must be addressed—without a single oversight—to avoid The Dip. How can project teams track all of this while juggling their day-to-day responsibilities? That's not easy. If it was, we'd see a 100% success rate, 100% of the time.

This is hard. We know—we've been there. (And we'll be there for you.)

Long before my hair went gray, I was a farm kid in rural Iowa. Life on the farm taught me that no one gets ahead on their own—success is a collective effort. The same holds true for CPG manufacturers. If The Dip is getting in your way, it may be time to deepen your bench of expertise, build a robust operational readiness team, and develop a plan that's tailored to your project.

This report will get you closer to that goal. It's more than just data. It captures the lessons we've learned over decades of bringing high-quality products to market, both on the manufacturing side and as a fully integrated service provider to the CPG industry. We've helped teams recover from The Dip—and even better, avoid it entirely. Keep reading to find out how.

Jason Robertson,
Vice President, Food + Beverage

To keep this conversation going, reach out to me directly at jason.robertson@crbgroup.com.

READY WHEN YOU ARE:
A STRUCTURED APPROACH TO OPERATIONAL READINESS.

Vertical startup success requires a bit of art, a lot of science, and dedicated coordination between multiple stakeholders. To help you get started, we've assembled a downloadable operational readiness "starter kit"—a practical template designed for teams like yours.

Get your copy here!

Heard this one before?

The concept of readiness has gained traction over the last five years, but misconceptions persist—even for highly experienced teams.

"That's not our responsibility."

Engineering assumes that operational readiness is Operations' problem. Operations assumes that Engineering's got it. In reality, readiness is the product of an integrated, cross-functional effort.

"We don't have time for that."

A "slow-down-to-speed-up" mindset is key when it comes to operational readiness planning. In fact, you need operational readiness most when you think you don't have time for it.

"That's something for new sites—not us."

Readiness isn't just for greenfield sites. Retrofits and brownfield upgrades benefit from a robust readiness strategy just as much.

"That's just operator training, right?"

Training matters—but it's only one piece of the operational readiness toolkit, which includes documentation, SOPs, quality specs, inventory strategies, and much more.

"If the line starts up, then we're ready."

Not quite. Readiness means more than flipping the switch—it means the minds, machines, materials, and methods involved in startup are prepared for a sustained ramp-up.

CPG operational readiness requirements

True operational readiness relies on dozens of interdependent elements.

SAFETY/ REGULATORY	ENGINEERING	INFORMATION TECHNOLOGY (IT)	MANUFACTURING OPERATIONS	COMMISSIONING, QUALIFICATION AND VALIDATION (CQV)
Food Safety Plan	Design and Procurement Strategy	IT Controls and Security	Operation Performance Definition (OEE)	Test Case Master Planning
Federal Regulations	Equipment Specs and Procurement	Data Management	Staffing Plans	Equipment Performance Specifications
Labels and Marketing Materials	Equipment Layout with Respect to Operator Centers and Workstations	MES Systems	Training Programs	Equipment Technical Specifications
Lock-out/Tag-out	Drawing Management Program	Quality Equipment Interface	Operational Scheduling/ Conversions	Design Reviews
Forklift Safety	Construction Documents and Management		Process Maps/ SOPs/ Reaction Plans Development, Critical Control Points, 5S	Operational Readiness Tracking and Monitoring
Pedestrian Segregation	Equipment Commissioning		Sanitation Procedures	Trace Matrix Establishment
Policy and Procedures – Injury Treatment, Infraction Policies	Contractor Qualification Program		Batch Records	Factory Acceptance Test (FAT)
Permits – Hot Work, Confined Space, Working at Heights			KPI Definition – OEE, Spoilage, and Downtime	Commissioning
Pest Control			Meeting Routine – Shift Handover, Daily and Weekly Production, Quarterly Communications, Procurement, Raw Materials, and Customer Meetings	Automation Integration Verification
				Site Acceptance Test (SAT)

MAINTENANCE	SUPPLY CHAIN	QUALITY ASSURANCE	QUALITY CONTROL	HUMAN RESOURCES (HR)
Maintenance and Sanitation Policies	Business Continuity	Quality Management System	Laboratory Operations	Job Descriptions
Equipment Set-up Parameters	Data System Management (ERP)	Quality Change Control Program	Sample Collection and Analysis	Hiring and Retention
Equipment Spare Parts Management	Material Specifications and Control	Document Control System	Sample Retention	Continuous Learning
Equipment Lube Routes, Preventative Maintenance, Predictive Maintenance/ Vibration Monitoring	Purchasing and Inspection	Customer Complaints and Recall	Environmental Monitoring	Define Plant Culture
Food Contact Surfaces	Vendor Management Program	Inspection Readiness Plan		Engagement Strategies
	Inventory Control Program (WMS or Production Warehouse Management)	Batch Release – Lot Numbering and Approval		Salary and Rewards Programs
	Sourcing Strategy	Audit and Inspection Policy		
	Procedures - Shipping and Logistics			
	Carrier Specifications			
	Receiving and Shipping Inspection Standards			
	Customs/Shipping Paperwork			
	Storeroom Consignment/ Strategy			
	Product Storage – Inventory Requirements/ Location			

Source: CRB

Meet the survey respondents

Nearly 400 leaders in CPG manufacturing across the U.S.A. answered our 54-question operational readiness survey. Some of those respondents participated in additional in-person interview sessions, providing an insider's view of the challenges facing startup teams today.

Average annual revenue

Small
(< $50M)
48%

Medium
($50M to $499M)
22%

Large
(≥ $500M)
30%

Company maturity

12%
are at pilot scale

88%
are at commercial-scale production

- **23%** with regional distribution
- **47%** with national distribution
- **18%** with global distribution

Detailed data charts can be found in the Firmographics section.

End-user job duties

31% Engineering

26% CEO/GM or other senior management

16% Production, Operations and Quality

Included in the remaining 27%: Package design, brand management, plant management, procurement, logistics and supply chain management, sales, regulatory affairs, and validation/compliance

How are they investing their capital budget?

Highest spend on a CapEx project

52% | < $5M
19% | $5M to $9M
12% | $10M to $49M
7% | $50M to $99M
3% | ≥ $100M

Types of projects in CapEx plan

73% | Process system improvements
69% | Packaging system improvements
66% | Automation and control system enhancements

CapEx spending today compared to two years ago

↑ **41%** | are spending more on **operational improvements**
↑ **21%** | are spending more on **expansions**
21% | are spending only on **necessary maintenance**

Capital budget payback period

4% | < 6 months
24% | 0.5 to 1.5 years
33% | 1.6 to 2.5 years
22% | 2.6 to 3.5 years
5% | ≥ 3.6 years

What's getting in their way?

Production barriers (top three)

44% | Labor availability/skilled workforce
39% | Aging technology/ equipment
36% | Inefficiencies or bottlenecks due to process equipment

Roadblocks to improvement (top three)

53% | Insufficient budget
49% | Not enough time
37% | Lack of defined strategy/roadmap

Preparation and planning

INSIDE:

Today, speed-to-market is driving most capital projects. Companies want to respond quickly to market demand, but often end up playing catch-up, adding a line a year, every year.

Planning is a way to get ahead by looking further into the future and controlling more variables from the beginning. Across all discussions with our survey respondents, a dominant theme emerged: success hinges on early and inclusive preparation that aligns your 4Ms: the minds, machines, materials, and methods of your project.

AUTHORS:



Josh Bailey, Regional Director, CQV
Dennis Collins, Architectural Department Head
Ken VonderHaar, Director of Client Engagement

To be ready when it matters, start planning before it's urgent

As a long-term, strategic priority for food, beverage and consumer product companies, more organizations are advancing proactive planning, integration, structured requirements, and cross-functional alignment to minimize The Dip and ensure lasting success.

WHAT WE'RE SEEING

- **10%** of respondents sometimes or never involve Operations in operational readiness planning
- Subject matter experts (SMEs), both internal and external, are often excluded from operational readiness planning
- Supply chain and equipment delays are leading threats to operational readiness

68%

of respondents say getting people involved early, giving them clear roles, and keeping them engaged throughout can help end users avoid The Dip.

THE GOOD NEWS

- ✓ 51% of companies are starting operational readiness discussions before budgetary approval
- ✓ Most respondents have operational readiness as an explicit line item in their budgets
  - When it's included, companies are typically allocating 1% to 3% of their total budget
- ✓ Effective equipment startup and commissioning planning have the biggest impact on meeting ramp-up volume targets

KEY TAKEAWAYS

PEOPLE ARE MORE IMPORTANT THAN PROCESSES.

Even more important than your established processes are the experts that will get you where you're going. Too often, project teams fail to consult available experts. At the early stages of planning, a few questions or a strategic meeting can make a huge difference in the whole life of the project.

DON'T JUST DEFAULT TO YOUR OLD METHODS.

It's an open secret that many engineers use tools and processes carried over from previous projects and careers. While these tools offer valuable wisdom, they're even better when shared, combined, and optimized for the project at hand. Battle-tested checklists, spreadsheets, or matrices that give the right level of granularity and responsibility are even more powerful when crowd-sourced to your whole project team.

PRODUCTIVE MEETINGS NEED CONCRETE OUTPUTS.

A surprising number of survey respondents—half—are discussing operational readiness from the very beginning. But data about equipment, maintenance, and training readiness issues indicate that those discussions are not getting the job done. Readiness requires more than talk: concrete actions, owners, deadlines, and planning tools, based on multi-team feedback can offer peace-of-mind and tangible tracking of progress.

"When planning doesn't include how the facility itself operates, the problems start to trickle in at startup. A process takes a little too long. You're missing an operator. Materials are late. Pretty soon you have a waterfall, wondering how it all happened."

— Josh Bailey

Creating an operationally ready facility is much more than building the box; it's crafting a complex ecosystem of processes and flows. Nothing should be left to the last minute. Proactive planning means solving problems before they ever get a chance to slow you down.

For fewer problems later, you should ask more questions sooner. Bringing more people to the planning table and getting their input at the beginning may seem like a delay, especially when everyone is eager to get to work, but ultimately it will save time and expand possibilities. External consultants may offer a broader view of technologies and techniques, from value stream mapping to integrated project approaches. OEMs can think early about customizations and training materials that can alleviate workforce or maintenance challenges. **Executives can factor in longer-range plans. End users can offer hands-on experiences of the last Dip and how they could have exited it sooner**.

With input from all stakeholders, you can build a more comprehensive plan and toolkit, and the more tangible, the better. Checklists of critical milestones should include precise timelines for equipment procurement, facility modifications, the installation process for new assets, commissioning, qualification, and validation (CQV) steps, and who's responsible for each line item. Successful teams are also embedding performance goals, training milestones, well-defined quality and maintenance procedures, automation strategies, detailed commissioning plans, and performance targets directly into their project execution discussions.

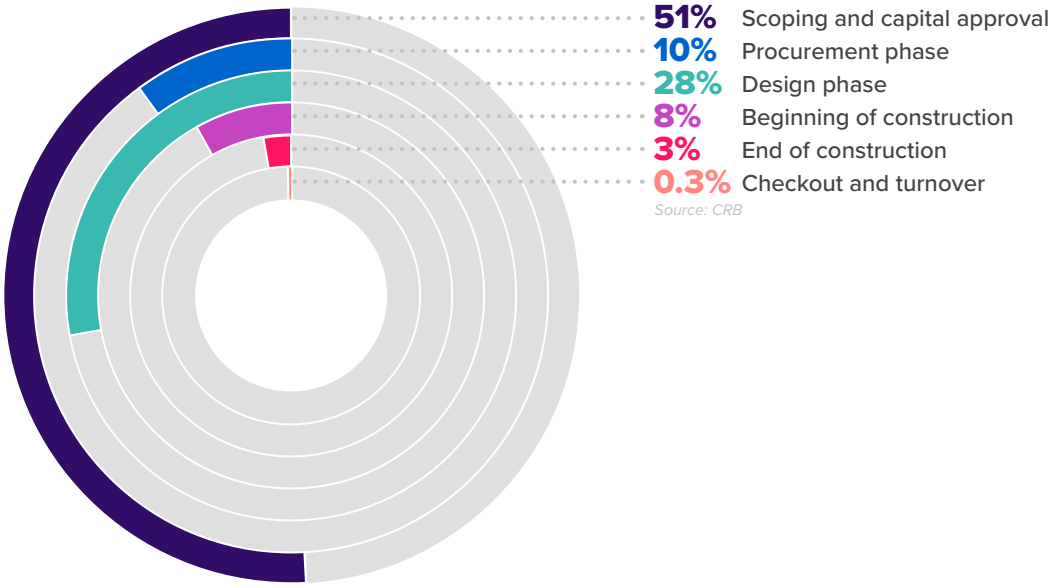
Without this information, the plan itself can stifle the facility's OEE, disconnecting actual results from project goals. While this marks a transformative shift for the CPG industry, the benefits to individual manufacturers are very practical, measured in dollars and days.

PLANNING FOR INDUSTRY 4.0

Survey results show that most respondents expect to make significant progress in digitization and automation in the next three to four years. This builds on the exact trends we observed in the 2024 *Horizons: Digital Age of Food Manufacturing* report, and we expect this will compel many companies to rethink their approach to planning. For example, last year, 74% of respondents used or planned to use digital technologies for enterprise-wide data sharing, connecting boardroom decisions with real-time plant floor operations. This kind of IT/OT convergence absolutely requires early collaboration between more teams, including IT, operations, engineering, and OEMs, which many of this year's respondents aren't including.

Figure 1.1 | Start of Operational Readiness Discussions

"At what stage does your company typically begin operational readiness discussions for a new facility or capital expenditure (CapEx) project?"



"OT and IT often speak different languages—and you need someone who can be that translator to align them before integration begins."

— Leader in CPG Manufacturing

Pre-funding: earlier planning is more popular

Figure 1.1 is a very positive indication of how seriously CPG companies are taking operational readiness and how they see it as foundational to the planning process. Half of respondents are starting operational readiness discussions before capital approval. This early engagement is a best practice, telling us that companies recognize operational readiness as foundational to project development.

The design phase is still early in the total process but misses the ability to make operational readiness a part of the scoping and budgeting process. This can produce gaps in financial requirements and performance expectations that are later felt. Without confidence in achieving, how can you answer a key question during this budgeting phase—does the project make economic sense?

BUT WHAT IS INCLUDED IN THE DISCUSSION?

While it seems that many companies begin operational readiness discussions early, it does raise some questions about the substance and frequency of these discussions. The participants have a big impact on the actual effectiveness of planning. Was someone from Operations present from the beginning? Which teams get decisive input? Often, early operational readiness discussions skew towards design, machinery and costs and lack considerations around workforce, procedures, and materials.

Ineffective planning at the beginning can create a negative delivery cycle downstream. Project owners chasing tight deadlines will often rush through the front end of the process, leading to late-stage surprises, such as delays and higher costs.

Pre-approval operational readiness planning generates a more accurate picture of input data, resource requirements, assumptions, and risks, and provides a forum for joint problem-solving. Ultimately, it ensures the business case is robust and enables informed decision-making (and peace of mind) when seeking capital approval.

65%

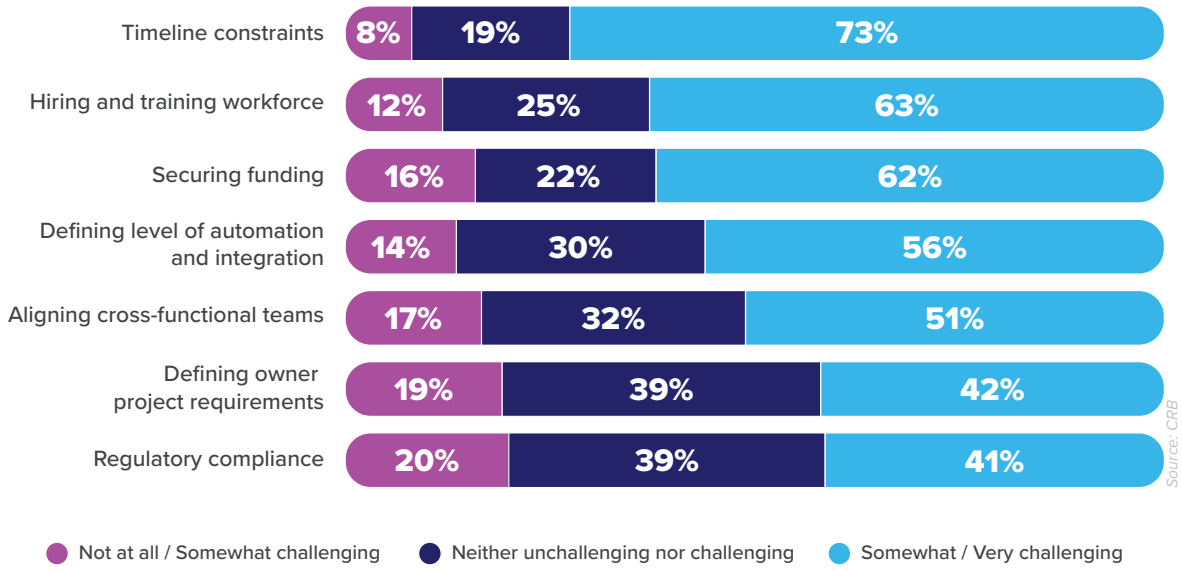
of $1B+ companies start operational readiness discussions before capital approval.

HOW LATE IS TOO LATE?

Late starts in operational readiness planning are less common, but still present, and are found across firmographic categories—happening at both the smallest and biggest companies surveyed. These might be the product of more reactive planning, which results in execution inefficiencies, training gaps, and production ramp-up delays. Or they could be indicative of companies thinking that smaller or less complex projects don't require upfront planning. We expect that this will become rarer, considering the respondents' ambitions for automation and digitization in the next few years as the consequences of delayed planning will become much more severe.

Figure 1.2 | Operational Readiness Challenges Ahead of Funding

"Prior to funding, how challenging are each of the following in relationship to operational readiness planning?"



FOR CPG CAPITAL PROJECTS, IT'S ALL ABOUT SPEED TO MARKET

The fact that timeline constraints top the list of challenges to operational readiness planning at this stage should be unsurprising. All else being equal, there is no way for a project to be completed too quickly. Whether it's meeting increased demand, expanding the product portfolio, or increasing efficiency to be more competitive, on-time project completion has direct consequences for market share and the ROI of the project. This can create pressure for teams to choose a shortcut instead of following project best practices, without considering all the factors that can impact delivery to market.

Clearly, workforce preparation is one of those major factors. Given current labor shortages across the industry, and the challenges of training people on new machinery and processes, more companies consider the workforce skill set a foundational aspect from the very beginning. Similarly, securing funding

Top challenges by size:

76%

of < $9M companies cite Securing Funding.

80%

of > $1B companies cite Timeline Constraints.

will always depend upon thorough pre-approval planning. Meanwhile, we've seen capital plan budgets hold relatively steady even while speed-to-market ambitions continue to climb.

CHOOSE YOUR COMPROMISES CAREFULLY

It's worth noting the prominence of technical definition and team alignment challenges, even though they are lower on the list. These can seem time-consuming when time is looming, but these are the very essence of planning and should be crucial to whether a project is approved and what kind of ROI is expected. Have you heard from all the experts who can help paint an accurate picture of the project? Having clear technical requirements outside of engineering from the beginning can ensure OEE targets are met. **Saving a week or two but not meeting your ramp-up curve is a poor bargain.**

WHY DETAILED BUDGETS MATTER

Capital plan budgeting allows you to make long-term strategic investments, allocate resources, perform risk management, and set performance expectations for the project.
Most importantly, with intentional operational readiness planning and defined ramp-up volumes, it will more accurately reflect how much return to expect for your effort and resources.

Figure 1.3 | Impacts on Operational Readiness

"How frequently do the following impact operational readiness?"

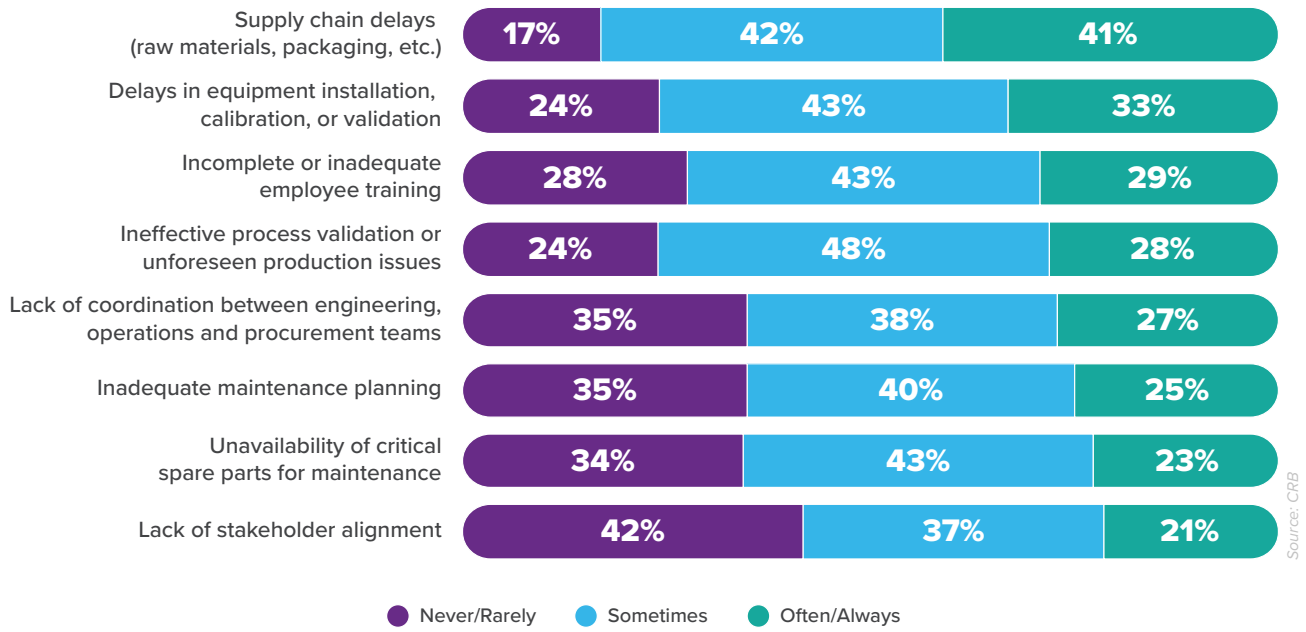
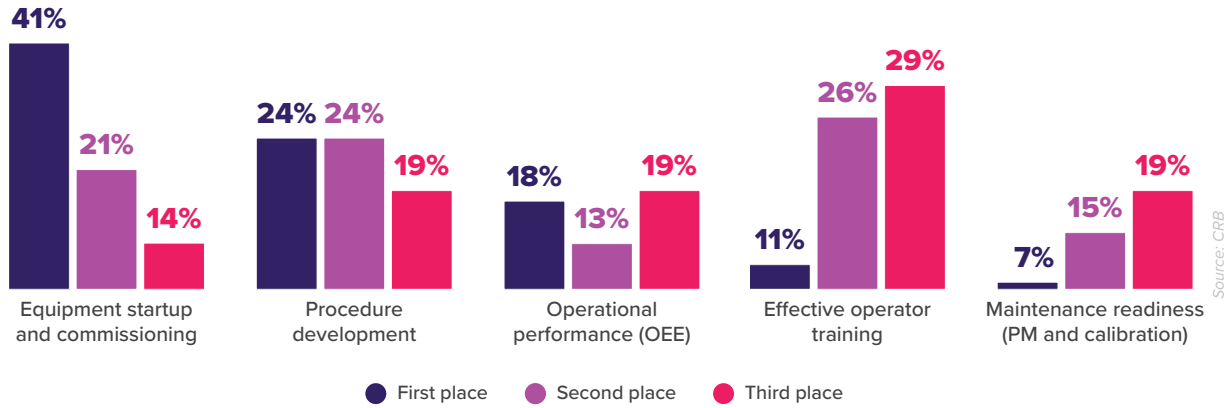


Figure 1.4 | Ranked Impact on Producing Saleable Product

"Please rank the following elements of operational readiness based on their impact on your company's ability to begin producing saleable products with the most important element in the number 1 position."



Challenges that will define your return on investment

The prominence of supply chain delays makes sense given the last few years, but even post-pandemic, we are still feeling their effects. These timelines need to be carefully accounted for. While there is room for creativity in solutions and sourcing, the supply chain is primarily something we all must respond to, not something that teams can often materially affect.

In contrast, many of the primary challenges highlighted in Figures 1.3 and 1.4 show how closely aligned operational readiness and startup are, with similar foundational challenges.

JOSH BAILEY
REGIONAL DIRECTOR, CQV

"When you're doing something new, relying on external expertise can make the difference between achieving a schedule that is based on reality versus an opinion."

EQUIPMENT CONCERNS

Equipment startup and commissioning is clearly seen as the most impactful on CPG companies when it comes to producing saleable products. Delays in equipment delivery and installation, reliability challenges in both preventive maintenance planning and spare parts availability, insufficient training, and various startup and commissioning failures all dovetail into equipment startup and commissioning delays or underperformance. For most projects, this is simply a deal-breaker, which explains its position at the top of the list in Figure 1.3.

Maintenance is an issue that we see more often in the field compared to what is explicitly called out in the survey results. Training people on new machinery (or in simulation) is sometimes missed in planning, along with spare parts. "Move fast and break things" is a reality when the line is filling 1,300 bottles a minute, and planning needs to absolutely account for what is needed to get it quickly back up and operating.

EFFECTIVE TRAINING

Beyond equipment, we see effective operator and maintenance technician training stand out second and third place in Figure 1.4. In our experience, while training deficits are an obvious factor, readiness issues often stem from poor alignment, weak cross-team coordination, and inadequate user requirements, which also explains the prominence of procedure development in holding product back.

Qualitative interview sessions were also conducted as part of our research. Those sessions highlighted that part of the challenges behind training effectiveness lay in workforce variability—including language barriers, literacy levels, and high turnover. For example, repeated training throughout the life of the project, rather than single sessions closer to startup, was identified as crucial not only for more efficient operations but also for improving retention. This addresses two key problems with a single solution. Respondents repeated that one-size-fits-all approaches are insufficient, and that companies should try to fully recognize their potential workforce issues from the planning stage. Doing so not only ensures training is properly budgeted, but also allows sufficient time to create clear, engaging documentation, work with OEMs on more intuitive human-machine interfaces (HMIs), and develop tailored solutions to the site's specific training challenges.

Figure 1.5 | Operational Readiness Budgeting Approach by Company Size

"Which best describes how your resources for operational readiness are allocated in your budget (X Annual Revenue)?"

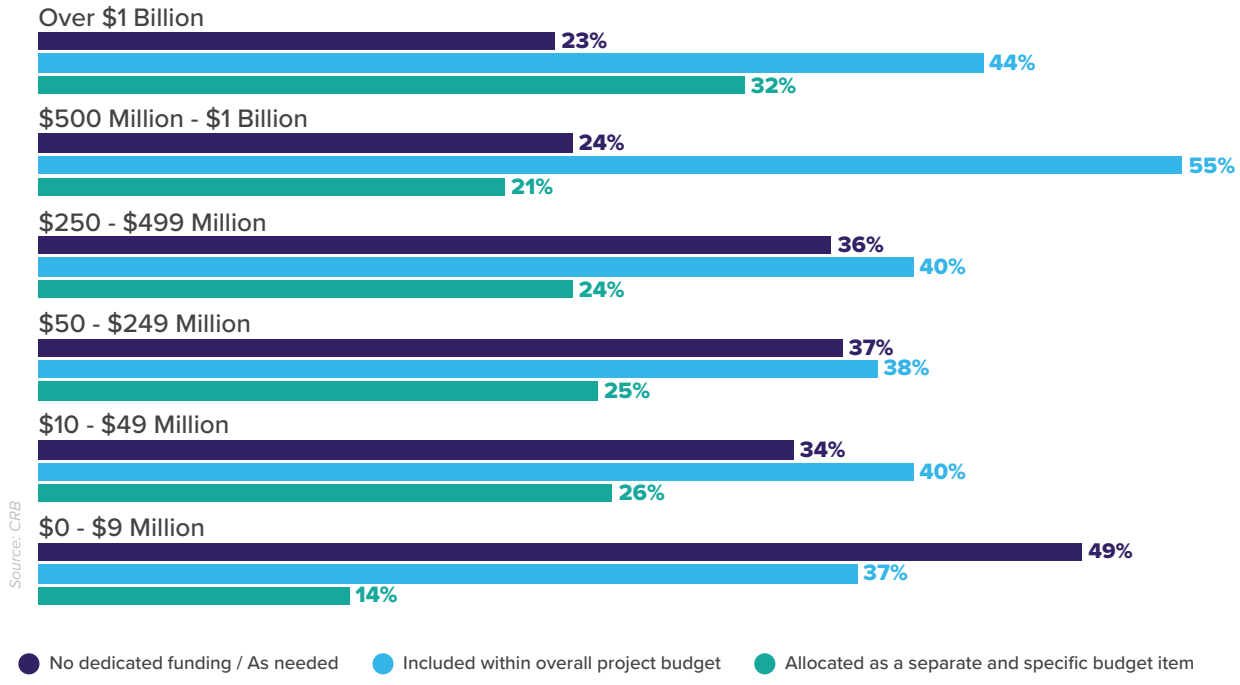
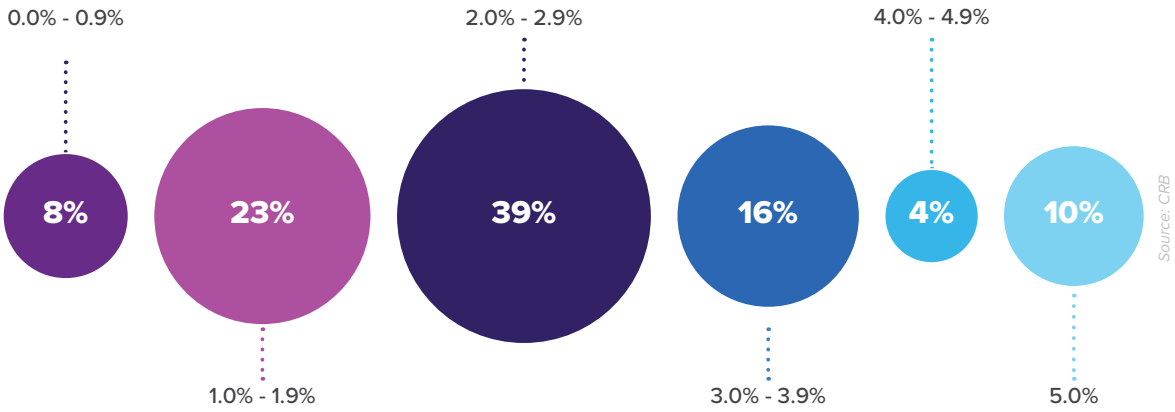


Figure 1.6 | Project Budget Allocated to Operational Readiness Over Past 3 Years

"For your last three capital projects, what percentage of total project budget was allocated to operational readiness, including capitalized resources?"



Structured planning is the pathway to certainty

We see two simultaneous trends in Figure 1.5. The first is that larger organizations are specifying operational readiness in their budgets as they are more likely to have structured processes and detailed execution methods. Smaller companies may operate more reactively, due to unfamiliar processes and limited resources. The second is that, as shown in later sections, many of the capital projects that CPG companies of all sizes undertake are improvements to existing operations, with smaller scope and ambition.

The risk for all companies that omit dedicated operational readiness items from their budgets is that funding or needed staff might be cut, and challenges arrive unexpectedly at the very end of the process.

Despite looking at this question from company revenue, employee count, or sub-industry, the average budget allocated to operational readiness consistently sat between 2% and 3%. This is very much in line with what we'd like to see! But, as around half of respondents weren't sure or didn't answer the question in Figure 1.6, we're likely seeing some significant sampling bias. Still, we were surprised by the percentage of companies dedicating 4% and even 5% of their total budgets to operational readiness. Most were very large companies, but not exclusively, so we expect these to indicate very complex and innovative projects that were staffed by teams familiar with the ROI of operational readiness.

KEN VONDERHAAR
DIRECTOR OF CLIENT ENGAGEMENT

"You can count the planning shortcuts by the number of surprises you see at startup. Or by how much your blood pressure has risen."

Figure 1.7 | Involvement in Operational Readiness Planning - Internal Groups

"How often is each of the following internal groups involved in your operational readiness planning?"

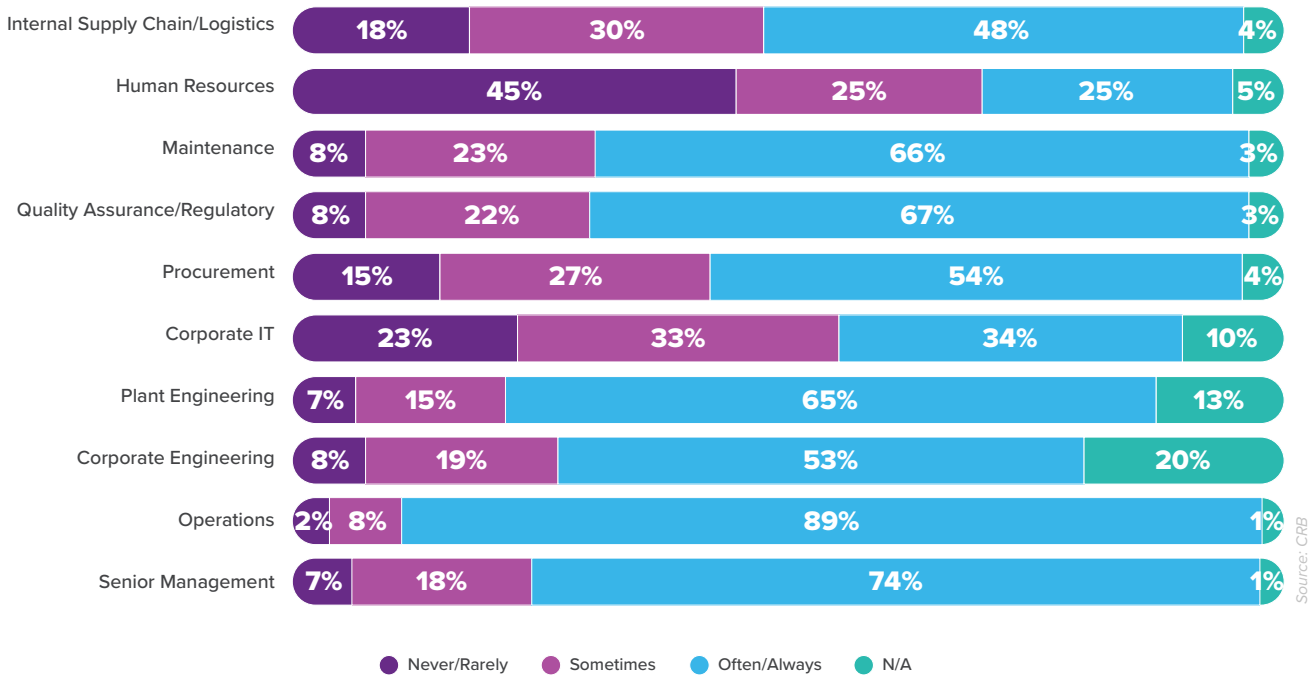
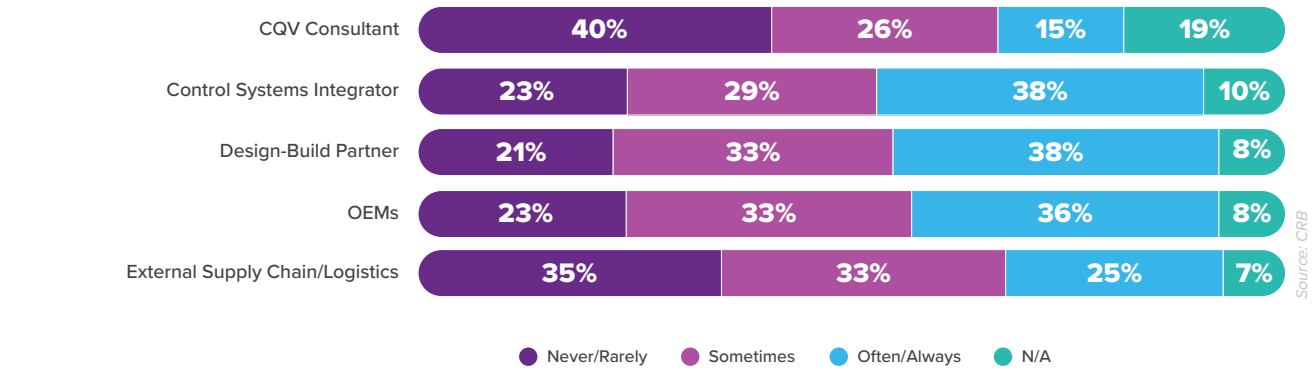


Figure 1.8 | Involvement in Operational Readiness Planning - External Groups

"How often is each of the following external groups involved in your operational readiness planning?"



Who gets invited to the planning party?

We would ideally like to see all these groups involved with planning, as it prevents blind spots and accelerates learning from project to project. For example, Plant Engineering may prioritize machine and utility performance, while Operations focuses on uptime, and Corporate IT prioritizes security—leading to conflicting decisions and missed opportunities.

We expect that the reason HR, IT, Quality Assurance, Procurement, or even Operations may be left out of planning has to do with the limited size or scope of some projects. We've all witnessed projects where a single piece of equipment was replaced, so some voices were excluded. The results can be very expensive. We expect to see the "Often/Always" bars for each group to keep growing over the next five years, as including key perspectives throughout the project is often the best way to ensure the original plan survives to startup.

"If you don't define key roles early—startup manager, training coordinator, lead operator—you're setting yourself up for failure."

— Leader in CPG Manufacturing

We've seen that delays and The Dip often stem from a lack of upfront clarity and objective insight. So much clarity can be derived from getting internal groups together, but the objective insight often comes from external groups. That's because they are separate from normal organizational pressures but also have recent experience beyond the constraints a given company faces today. Without that larger perspective, some internal teams have gone as far as expecting a dip in performance post-handover, lowering the overall ceiling for success.

DENNIS COLLINS
ARCHITECTURAL DEPARTMENT HEAD

"Early cross-collaboration with both internal and external experts opens up so many new doors, from creative solutions to schedule certainty."

For example, some of the most successful projects we've seen included getting OEMs and end users together at the planning stage. Otherwise, **OEMs report not regularly receiving clear success criteria, integration specs, or training expectations early enough to design accordingly**. CQV consultants, also sometimes left out of planning, have a keen awareness of the factors that will drive success. This can range from how long it takes to bring equipment online, ensuring testing addresses the critical elements that deliver product, to identifying ways that equipment delays can be prevented.

We consistently find that cross-functional involvement in planning can predict a lot about how a project will proceed... and what kinds of challenges it's going to have.

Making readiness real: Recommendations for planning and preparation

CPG manufacturers are facing unprecedented pressure to optimize operations, minimize time-to-market, and maximize returns on capital investment. Operational readiness is the industry's response to this call—a structured approach to transition from capital project execution to full production efficiency. As is emphasized in every other section in this report, **the value of readiness should connect back to meeting OEE targets, improving ROI, and avoiding The Dip**. Many of our respondents indicate that these challenges are solvable with earlier stakeholder collaboration, standardized approaches, and a more realistic acknowledgment of team and workforce realities. This marks a transformative shift in how manufacturers prepare for success.

Operational readiness is no longer just about having the right equipment; it's about having the right ecosystem, built on collaboration, communication, and continuous improvement. This shift requires cultural change within both OEMs and end users, a willingness to invest in foundational capabilities, and a shared commitment to long-term success.

Test, simulate, and prototype earlier

CPG companies are no longer waiting for process and packaging systems to prove themselves post-installation. Instead, they find opportunities to evaluate and predict success from day one.

Involve teams earlier

Every readiness planning program should integrate cross-functional collaboration, bringing people to the table early to prevent blind spots, confusion, and, worst of all, delays.

Designate handover recipients

Operations and end users should be designated and involved in the planning stage. External partners in our survey noted that sometimes key personnel like startup managers and operator leads were not engaged in FAT and SAT activities, which almost guarantees that The Dip will strike hard.

Prioritize and allocate resources

Make operational readiness a high priority in both capital funding requests and resource allocation to ensure it doesn't get lost in the inevitable competition for funding, staff, and attention.

Break down cultural barriers to collaboration

Explore methods to dismantle internal company silos among departments such as Operations, Engineering, IT, and Corporate Leadership. The same applies to external silos—both OEMs and consultants frequently report being left out of early decisions, only joining the process when their ability to effect positive change is significantly reduced.

Don't wait to train

With training a consistent (and unpredictable) pain point, it's never too early to start laying out your requirements with Operations and your OEMs. Not only can this curtail The Dip, but it can also help with retention and collaboration.

Don't look for silver bullets

Many of your key challenges will be subtle and interlocking. Use the breadth of expertise and experience available to you to unpack the problems you can spot immediately and then dive deeper.

UP NEXT:

Thorough and structured planning and some great decision-making are only truly appreciated later, when hard work starts to pay off downstream in toolset development and commissioning.

Toolset development

INSIDE:

You already know that a vertical ramp-up is only possible if critical tools like regulatory documents, quality standards, and training programs are in place. But who should develop those tools? How long will that take? Which ones are essential from day one, and which can wait for later project phases? These questions are easily overlooked during early project scoping, especially when pressure to move fast and control spending is high. But as the survey data in this section shows, developing the right readiness tools at the right time is the most effective way to build certainty into your ramp-up schedule.

AUTHORS:



Pablo Coronel, PhD, Senior Fellow, Food Processing and Food Safety
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Matthew Lantzy, Senior Project Director

Measure three times, cut once: Readiness tools prevent costly mistakes

When budgets are tight, manufacturers may see training programs and other readiness tools as expendable. But delaying or shrinking an investment in these tools can lead to major costs down the line, when a preventable misstep stalls progress.

WHAT WE'RE SEEING

It is tough out there. Manufacturers are under pressure to do more with less, forcing difficult decisions during the critical early phases of project roll-out. According to our survey respondents, three key constraints are driving these decisions:

- **A lack of time—51%** of respondents say they're impacted by limitations on training time.
- **A lack of budget—43%** of respondents say that an insufficient training budget is a top challenge.
- **A lack of prioritization**—a quarter of respondents say that developing effective operational procedures is not a priority.

Although most respondents allocate 1% to 3% of their total budget to operational readiness,

79%

say cost is their #1 barrier to a vertical startup.

THE GOOD NEWS

Despite these challenges, many manufacturers are reporting progress towards improved operational readiness:

- ✓ **Nearly 50%** of respondents have standardized when and how to develop readiness tools.
- ✓ **Most** respondents start to develop at least some readiness tools during early scoping and capital approval phases.
- ✓ **66%** of respondents are extending their in-house operational readiness bandwidth by partnering with outside experts.

What belongs in your operational readiness toolkit?

PEOPLE & TRAINING

- ✓ Documentation identifying employees and supervisors assigned to the new project
- ✓ Hiring plans
- ✓ Employee training programs
- ✓ Maintenance and EHS training, including Lockout/Tagout (LOTO) procedures
- ✓ Process Map and SOPs

PROCESS CONTROL & GOVERNANCE

- ✓ Team room
- ✓ Description of operations
- ✓ Quality and sanitation standards and specs
- ✓ Preventive controls
- ✓ Record keeping standards

TECHNOLOGY & INFRASTRUCTURE

- ✓ Commissioning and verification protocols
- ✓ OEE ramp-up plan
- ✓ Dynamic inventory strategies
- ✓ Preventative maintenance plan (artificial intelligence/ machine learning integrations)
- ✓ Spare parts strategy
- ✓ Change management and change control strategy
- ✓ Data backup and historian

REAL-WORLD EXAMPLE

INVEST UP FRONT… OR RISK PAYING MORE LATER.

We worked with a manufacturer struggling with startup. They had dismissed an expert's recommendation early in their project, only to hit trouble when it was too late to avoid the fallout. As a result, what should have been a three-week ramp-up stretched to several months, costing hundreds of thousands of dollars in missed production and emergency support. The lesson? Involve expert partners early—and trust their advice as you make key decisions. It's far less expensive than fixing problems after they've taken root.

“If you get the right tools and training in place before the rush of turnover, you’re setting yourself up for a startup that meets expectations. That is how you avoid The Dip.”

Matthew Lantzy,
Senior Project Director

KEY TAKEAWAYS

PRIORITIZE STRUCTURE OVER STANDARDIZATION.

A standardized approach to developing readiness tools can help keep projects on track in high-pressure situations, but we've often seen standardized plans left on a shelf, unused. What really makes a difference is a structured, phase-aligned plan that accommodates the nuances and needs of individual project sites without sacrificing certainty, giving project teams a clear path forward and the flexibility to make adaptations along the way.

TRAINING IS YOUR STRONGEST RAMP-UP GUARANTEE.

A malfunctioning pump isn't the biggest threat to your ramp-up curve—it's inadequate training, leaving your operation prone to errors and maintenance issues. Yet 60% of survey respondents say they backload training to the final stages of project delivery—when the OEM is packing up, the budget is running out, and performance dips are on the horizon. For greater ramp-up certainty, early training and a focus on "training the trainers" is a strategic imperative.

A GAP ANALYSIS CAN PREVENT ERRORS AND IMPROVE SPEED.

No one knows your process better than your own team, which explains why 68% of survey respondents develop ramp-up plans entirely or mostly in-house. But all the expertise in the world won't help if your team doesn't have the bandwidth to oversee each project phase. To avoid the delays and overruns that some manufacturers described during our survey period, an honest and robust gap analysis of both skills and availability is key.

Into the data: Readiness toolsets

A STANDARDIZED APPROACH IS GOOD. A STRUCTURED APPROACH IS REALISTIC.

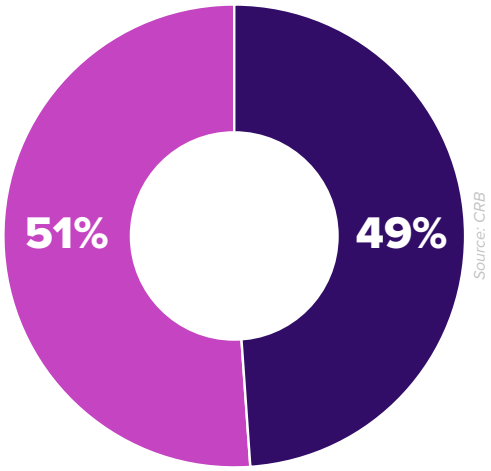
We were surprised that nearly half of the respondents have a standardized approach to guide when and how operational readiness tools are developed (Figure 2.1). In our experience, such standardization is rare—or at least, it's rare to see a standard approach to operational readiness applied consistently. Projects are shaped by individual practices, shifting timelines, and teams with competing priorities. For that reason, a structured approach may be preferable—less like a set of rigid directions, and more like a roadmap to help project teams navigate unexpected detours.

A structured approach establishes a broad methodology that can help teams define when and how to develop key readiness tools within a project's specific context. It can deliver many of the same benefits of true standardization: faster decision-making, repeatable results, and incremental efficiencies that add up over time. At the same time, structure is unlike standardization because it gives teams the flexibility to adjust their readiness approach without sacrificing certainty.

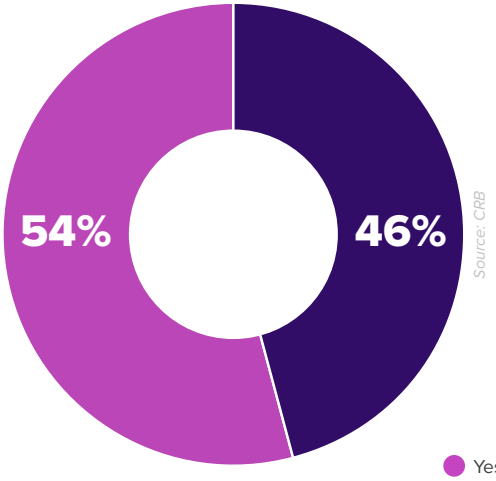
Figure 2.1

"Is there a standardized approach (policy and procedure) to how and when these tools are developed within your organization?"

Standardized How Tools are Developed



Standardized When Tools are Developed



REAL-WORLD EXAMPLE

STRUCTURED > STRICT

A global beverage manufacturer told us they have a standardized approach to readiness—but by their own admission, they don't always apply it. Instead, they lean on a structured methodology that they adapt across various types of projects, process installations, and production lines. That shared structure keeps teams aligned, even when they don't follow the playbook perfectly.

WHEN ARE MANUFACTURERS BUILDING OPERATIONAL READINESS TOOLS?

According to our survey, most manufacturers concentrate their tool development activities during the design phase, with small bursts of activity also occurring during early scoping and much later in the project delivery cycle, when construction is nearing completion.

In general, this trend aligns with best practices. Not all readiness tools need to be developed simultaneously; a staggered, structured approach can work well. But we did notice three areas of concern, where specific readiness activities are falling too late in the project cycle for many manufacturers, leaving them vulnerable to the post-startup dip. In particular:

Description of Operations

A quarter of respondents reported preparing their Description of Operations during construction or later (Figure 2.2). This robust documentation is essential to the development of nearly every other readiness tool, from SOPs to training programs to Critical Control Points. Core infrastructural documents like Piping and Instrumentation Diagrams (P&IDs) rely on it, and it informs mission-critical elements such as human-machine interface (HMI) design and quality assurance planning. To maximize the strategic value of this documentation, its development should be an early-stage priority.

Commissioning and verification documentation

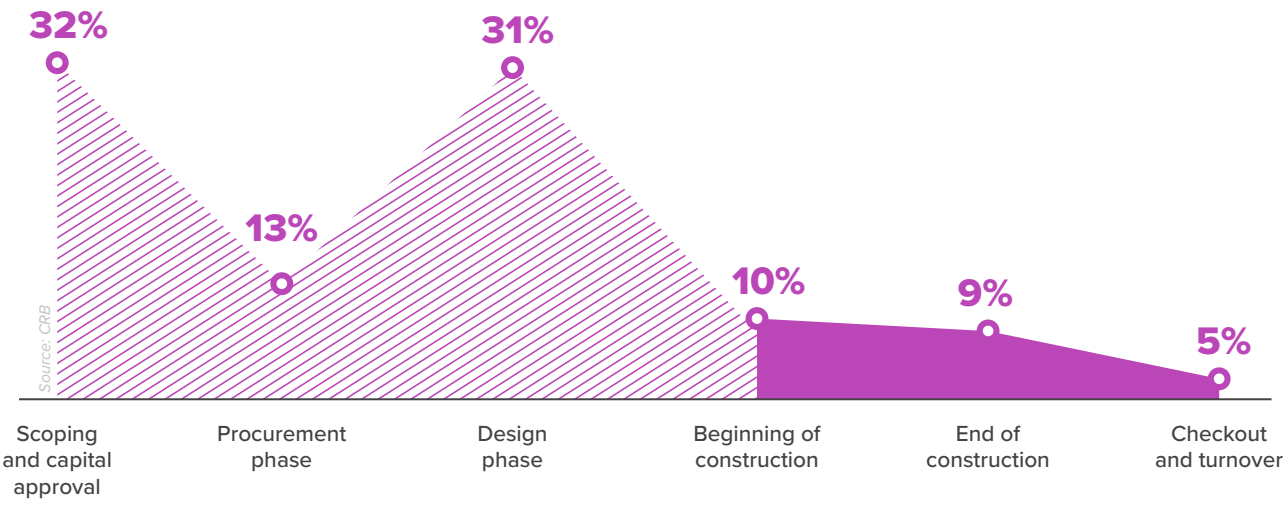
A commissioning and verification plan should be in place while construction is ongoing, with the flexibility to adapt to the as-built reality. This will ensure operational readiness and support an accelerated ramp-up curve. But nearly two-thirds of respondents aren't meeting that best practice, postponing commissioning and verification preparation to the end of construction or later (Figure 2.3).

Employee training programs

Training programs are arguably the single biggest driver of ramp-up success, yet their development falls late in the delivery lifecycle for many manufacturers (Figure 2.4). More than a third of respondents said they don't turn their attention to this key readiness tool until construction is nearly complete, and another quarter don't finish preparing their training programs

Figure 2.2 | Description of Operations

"At what stage of operational readiness is your company most likely to have a Description of Operations prepared?"



until turnover. That delay can create significant downstream challenges. It's especially critical to train key personnel early, such as the line supervisors and maintenance leaders who will go on to train the broader workforce. There's often too little left in the capital budget to do this well during later project phases—which is exactly when gaps in workforce readiness can cause serious problems.

Figure 2.3 | Commissioning and Verification Plan

"At what stage of operational readiness is your company most likely to have a commissioning and verification plan prepared?"

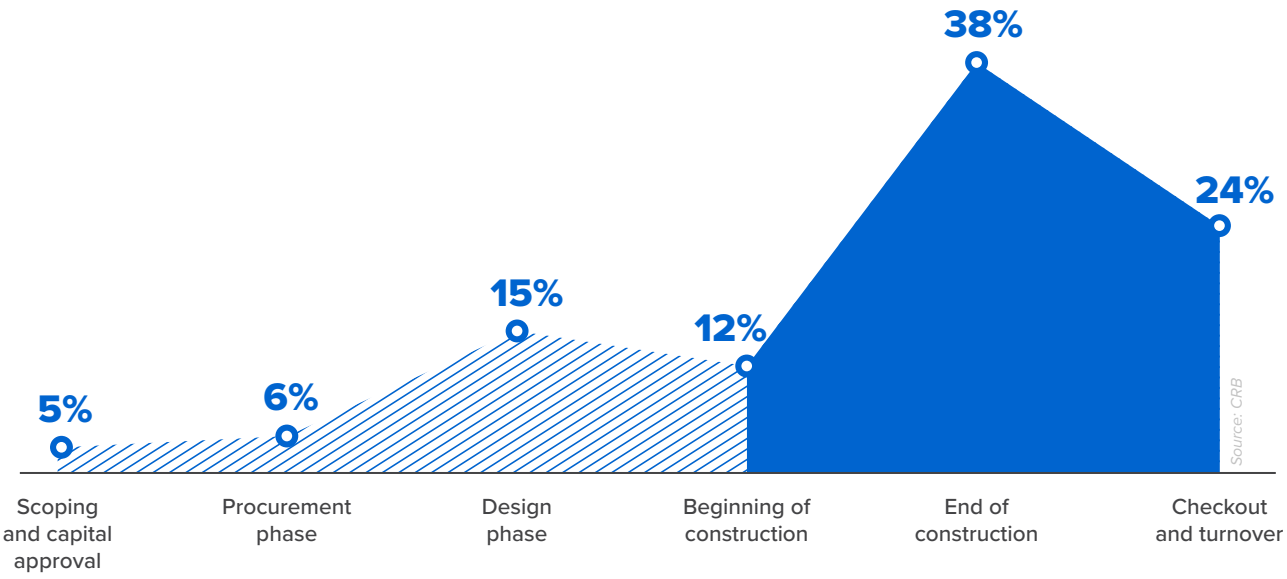
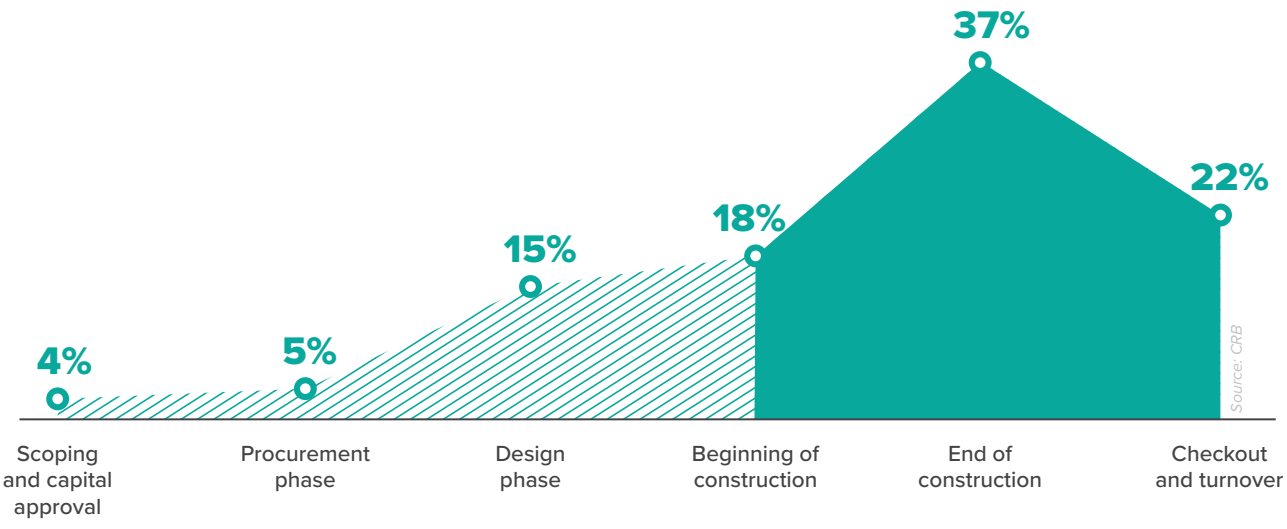


Figure 2.4 | Employee Training Programs

"At what stage of operational readiness is your company most likely to have employee training programs prepared?"



WHO'S HELPING TO DEVELOP OPERATIONAL READINESS TOOLS?

Nearly a third of survey respondents rely entirely on in-house teams to develop their operational readiness tools (Figure 2.5). You might expect larger companies, with a deeper bench of internal expertise, to lead this group—actually, the opposite is true. It's the smallest companies that are most likely to go fully in-house, while larger firms tend towards a mix of internal and external contributors.

This may be because larger companies have the experience—and the scars—to know how much time and effort is required to oversee a successful ramp-up, as well as the financial resources to engage external partners early. As you'll read later in this section, this strategy helps to avoid the late-stage scrambling that happens when internal bandwidth falls short.

"When the vendor rep walks out the door, training becomes your safety net. And if it isn't in place, you're going to feel it immediately."

— Pablo Coronel, PhD

11%
more likely

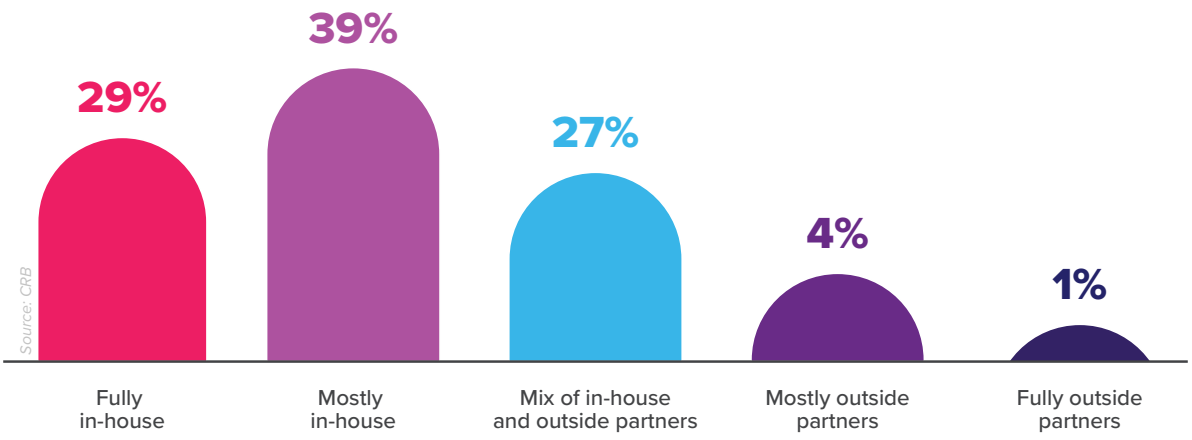
Smaller companies (up to 999 full-time employees) are 11% more likely to stay fully in-house.

49%
more likely

Larger companies (more than 100,000 full-time employees) are 49% more likely to use a mix of in-house and outside partners.

Figure 2.5 | Developing Operational Procedures

"For a typical project, to what extent does your company develop operational procedures in-house versus relying on outside partners?"



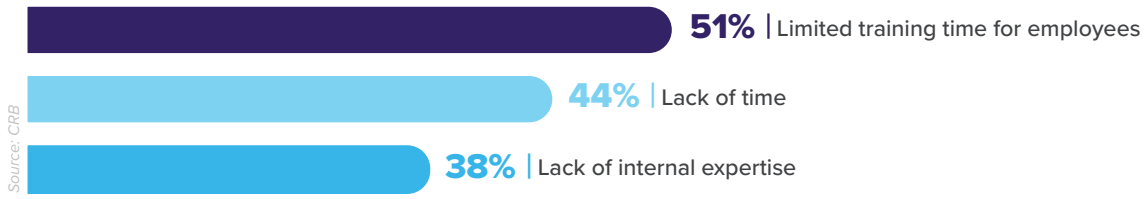
Deep dive: Workforce training as a readiness imperative

LIMITED TIME MAY EXPLAIN PREFERENCE FOR ON-THE-JOB TRAINING. BUT IS IT WORKING?

When asked about challenges that make it difficult to develop effective operational procedures, the majority of survey respondents pointed to a lack of time, both as an overall problem and a training-specific constraint (Figure 2.6). This may explain why on-the-job training outpaces many other options as the most effective training method (Figure 2.7). With no bandwidth for dedicated classroom learning or other resource-heavy modalities, manufacturers are turning to a pragmatic, hands-on strategy and hoping it works.

Figure 2.6 | Developing Operational Procedures

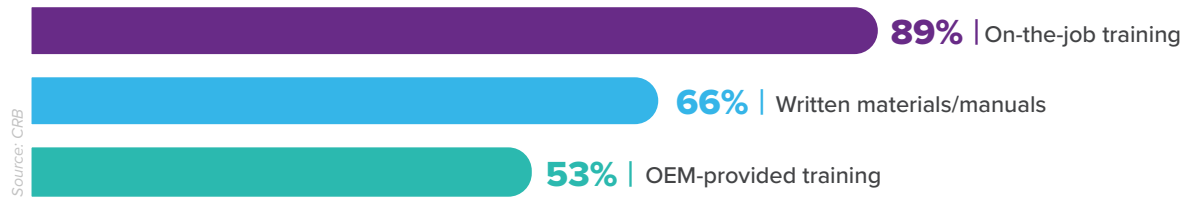
"What are the top primary challenges your company faces when developing effective operational procedures?"



See appendix for expanded chart.

Figure 2.7 | Most Effective Training Methods for Operational Readiness

"What types of training methods have been most effective for preparing staff to ensure operational readiness?"



See appendix for expanded chart.

So—*does* it work? The answer appears to be "not really" (Figure 2.8). **Less than 10% of survey respondents judge their overall training approach as "very effective."** Twice that number say that their programs are in fact very or somewhat *ineffective*. And nearly half of all respondents are somewhere in between, rating their training as "somewhat effective"—a concerning assessment, especially given the high stakes of a ramp-up project.

"Ramp-up success isn't just about what you install—it's about how well you've prepared your team to run it. Given the level of automation we're seeing in today's plants, skills development is more important than ever."

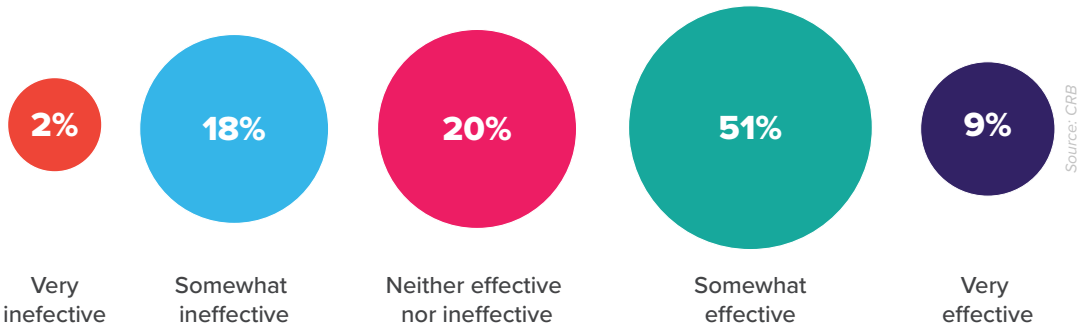
— Niranjan Kulkarni, PhD

47%

of survey respondents said predicting potential failures is their top challenge. The predictive capabilities of AI and machine learning could address this issue, which may explain why one-third of survey respondents are spending **between $1M and $20M annually** on automation projects, continuing a trend we saw in the 2024 *Horizons: Digital Age of Food Manufacturing* report. But smarter systems need smarter teams. Aligning training programs with the future of predictive maintenance is essential—a concept known as autonomation.

Figure 2.8 | Current Training Program Effectiveness

"How effective are your current training programs in preparing employees for operational readiness?"



87%

of survey respondents do *not* rank food safety and sanitation skills as a top concern when hiring. That may indicate a risk of overconfidence. A contamination event, cleaning failure, or skipped protocol could seriously delay ramp-up. Investing in a robust training program designed to build a culture of food safety and the skills to back it up is one of the most effective ways to ensure operational readiness.

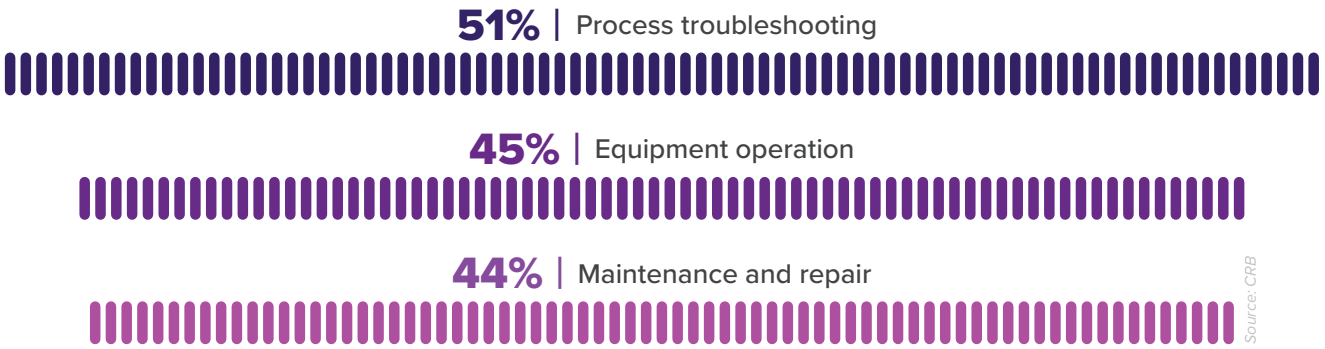
TRAINING MUST KEEP PACE WITH ADVANCED LEVELS OF COMPLEXITY.

More than 45% of respondents plan to incorporate advanced capabilities such as predictive, real-time analytics over the next three years. As manufacturers progress along this curve toward greater digital maturity and deeper IT/OT integration, the skill sets required to operate and maintain production systems are changing fast. With each successive wave of advancement, roles on the plant floor become more technical and data driven.

This shift puts pressure on training programs, especially as manufacturers face a persistent skills gap. According to our respondents, the top three areas of concern when hiring for a new production line include process troubleshooting, equipment operation, and maintenance and repair (Figure 2.9)—precisely the skills that become more critical as systems become more complex. To bridge this gap, manufacturers must develop proactive, tailored training approaches that align with the digital systems they plan to deploy.

Figure 2.9 | Production Line Skill Gap

"What skills gaps do you encounter most when hiring for a new production line?"



See appendix for expanded chart.

Making readiness real: Recommendations for building an operational readiness toolkit

These recommendations are grounded in the survey data and shaped by lessons we've learned from hundreds of capital projects. When it comes to developing a robust operational readiness toolkit, we've seen it all: what works, where things go wrong, and which strategies make the biggest difference in laying the groundwork for a streamlined, accelerated ramp-up process.

Apply a structured approach:

Every project is different—your readiness strategy should reflect that.

Develop a structured methodology during early scoping to guide when and how you'll build each readiness tool. This isn't about rigid standardization—it's about relying on a repeatable, phase-aligned approach that accounts for project-specific complexities and risks.

Get honest about internal bandwidth and address gaps in expertise/ availability early:

- **If you're planning to develop your readiness toolset entirely in-house, be honest about your team's expertise and availability.**

As we saw early in this section, many survey respondents reported that a lack of internal prioritization was impeding their operational readiness planning. In our experience, that comes down to the danger of underestimating the level of time and attention required to ensure a vertical startup.

Each team member working on your readiness toolset should expect to dedicate between 10% and 25% of focused time to the project, on average. Depending on their role and the project phase, some team members may need to invest 100% of their time.

Is that realistic? Successful teams answer that question early and work toward strong internal alignment on the time and effort required to meet project milestones.

- If you're planning a hybrid approach, plan early to achieve the right mix of internal and external expertise.

Start by undertaking a structured gap analysis, then look for partners who complement—rather than duplicate—your internal strengths.

Securing the right outside support early is key, especially for complex projects when even small cracks in execution can become major ramp-up delays.

Approach training like it's your best guarantee of ramp-up success

- Connect training with a bigger-picture purpose.

In our experience, technical training is most effective when it's grounded in purpose. Whether they're making baby food to nourish future generations or performing quality tests to keep consumers safe, employees are more likely to retain what matters when they know why it matters.

For example, it's not just about knowing how to operate a filler on a line producing chocolate milk—it's about understanding that consistent fill volumes and other quality standards help ensure food safety and product integrity, so that kids can enjoy what's in their lunchbox, risk-free. Start with the big picture, then drill down to specifics.

- Consider the trainees and what they need to succeed.

"We assume operators can read and speak English. That's a bad assumption. In some plants, people come in with thirty different languages."

— Leader in CPG Manufacturing

An effective training program is structured to meet people where they are.

In many plants, for example, the workforce may be made up of people who don't speak English as their first language. Relying on written materials may limit their comprehension and increase the risk of mistakes. Instead, consider visual training tools, such as illustrated SOPs, icon-based step-by-step guides, and AR/VR simulations.

Approach training like it's your best guarantee of ramp-up success. (continued):

- Build a mix of strategies tailored to your project's needs.

"When the techs leave and the operators are finally on their own, that's when things fall apart."

— Leader in CPG Manufacturing

While on-the-job training is popular among survey respondents, it's not always effective on its own—especially on projects featuring complex processes or new automation technologies. To ensure that your workforce is truly ready for ramp-up, approach training with a combination of modalities designed to maximize your employees' comprehension and skills development.

To determine the right combination for your project, consider:

Project complexity and automation level: Advanced systems may require equally advanced training, using simulations and other tools for early skills development.

Workforce skill level: Identify potential gaps in your current or prospective team members and plan your training approach accordingly.

Role-specific needs: Maintenance teams, for example, may require deeper technical training than operators, which is often delivered in partnership with OEMs.

Trainer qualifications: Ensure those delivering the training—including maintenance leads and line supervisors—are equipped not just with technical expertise, but with the training they need to teach others effectively.

Potential training modalities and considerations for successful implementation:

- **On-the-job training** works best when supported by pre-trained personnel. Ideally, OEMs should be involved in this "train-the-trainers" program, which should start in time to prepare trainers well before the first product run.
- **AR/VR training** can give employees hands-on experience with real-world scenarios (without putting real-world safety or product integrity at risk).

Approach training like it's your best guarantee of ramp-up success. (continued):

> *"We've seen operators trained once, then they're gone two weeks later. You can't keep up with that unless you're doing repeatable, accessible training."*
>
> *— Leader in CPG Manufacturing*

- **Classroom instruction** can provide a calm, low-stakes environment that's conducive to deeper understanding.
- **Short-format ("TikTok-style") recorded videos** can help to boost retention and reinforce key concepts. Thanks to the influence of social media, many employees may find this format familiar, accessible, and easy to engage with.
- For scenarios in which operators require specialized skills to work with highly automated or complex systems, a **dedicated training suite** complemented by simulators or physical models may be necessary. This approach allows training to start early—often as early as procurement or while FATs are underway—without waiting for equipment installation.
- **A partnership with local colleges** can provide a strategic advantage by establishing a pipeline of hands-on talent with the skills to manage complex, digitally sophisticated equipment.

UP NEXT:

Even the most robust readiness toolsets require disciplined execution and vigilant follow-through to ensure a successful Commissioning phase.

Commissioning

INSIDE:

After all the time, money, and effort of planning and building toolsets, now is the time to deliver on promises. The new assets need to justify the cost and achieve the production goals laid out in the capital approval process. Still, companies often fall short here, with some seeing 30% of anticipated ROI leaking during the transition from checkout to startup. Projects that focus exclusively on speed and budget miss operational risks and result in less-than-optimal utilization and OEE. We see this in higher maintenance costs, lower output, more unplanned downtime, and lower ROI. Sometimes these issues are temporary, but sometimes The Dip in productivity is permanent. In this section, we'll examine how today's manufacturers are addressing these issues, and the best practices they're implementing to clear the way for a smooth commissioning process and a reliable launch.

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Launching into full-scale startup success

Now is the time to ensure equipment is installed correctly, everything operates as designed and can be properly maintained, the staff is trained, and performance is monitored going forward. Still, failure to address design and operational risks can endanger the long-term performance of new capital investments.

WHAT WE'RE SEEING

Early decisions, even seemingly minor ones, can have cascading effects on maintainability, reliability, and overall performance. Many companies—both large and small—are skipping readiness planning and checklists and paying the price.

- **66%** of CPG companies regularly **miss their target start-up dates**
- **Insufficient planning drives the top causes of delays**
- **33% of companies see supply chain as a leading challenge**

THE GOOD NEWS

Today's CPG companies exceed our expectations in cross-functional collaboration and a multi-dimensional approach to solutions and goal setting.

- ✓ **4/5 of CPG companies prioritize production** output as a key metric for commissioning success.
- ✓ **Collaboration and early involvement are keys to success** in both small and large companies.
- ✓ More companies take a **comprehensive approach to addressing operational risks.**
- ✓ As they grow, companies **incorporate more expertise in target date setting.**

KEY TAKEAWAYS

SUCCESS IS CROSS-DISCIPLINARY.

Do not forget that operational readiness is a holistic approach from beginning to end. A well-managed plan is a concise strategy to coordinate a diverse range of activities and expertise, and to ensure optimal performance throughout the entire lifecycle of a new facility. This may require extra tools like checklists and RACI charts to track who is responsible and what progress has been made.

PRO TIP **Access our template to get started here.**

ROI MATTERS MORE THAN HITTING YOUR TARGET DATE.

While hitting your production date is a clear metric, there will be cases where it is not the most important KPI. If a moderate delay means reducing The Dip and hitting your OEE target more quickly, that can have a much more positive impact on your project's overall ROI. The only way to successfully make that call is to have your operational readiness plan detailed and up to date.

COMPLEXITY IS UNAVOIDABLE.

Both small and large companies cite an extremely wide range of challenges and solution strategies across their projects. Technical complexity is simply a reality during commissioning, and must be addressed through a combination of SMEs, procedures, and completion tracking systems that ensure all systems are designed, installed, tested, and operated according to operational requirements.

“Commissioning may be the most common stage to solve problems, but it is also the riskiest and most expensive.”

Ken VonderHaar,
Director of Client Engagement

Defining production dates

WHEN DO YOU MAKE THE CALL?

The exact point at which organizations are able to finalize their saleable production date goes to the heart of operational readiness: are you ready and able to deliver? For almost any project, we would expect projects' teams to establish an anticipated production date at scoping and before capital approval. Time to market will definitively shape a project's expected ROI, which will in turn determine whether or not it is approved. The spread of responses here reflects the reality we see most often: this date will change as a reflection of project progress with the inevitable surprises and challenges, often delaying the original in-service date.

Here, an interesting question is: "How often are the initial approved date and the actual final production date the same?" In these results (Figure 3.1), you could argue the answer is 10%. Looking deeper at the underlying numbers, we see that larger organizations tend to finalize the production date earlier, with almost 20% of companies over $1B finalizing at the first step (and presumably carrying that through to production). The smaller companies skew later, possibly reflecting differences in project management and risk tolerance.

Typically, we would expect a reliable final production date to be set at the end of construction. At this point, schedule impacts like supply chain delays have been put to the test, and the end is more or less in sight. Depending on the complexity of the project, teams may also be much more comfortable finalizing production dates at the last step, where the equipment is up and running, and the right people are operating it.

WHO MAKES THE CALL?

In terms of who decides, Operations maintains the most consistent numbers across different sizes of companies, from less than $9M in revenue to more than $1B. These teams have the most direct responsibility for delivering, and we would like always to see them at least involved in the decision. In our experience, meeting your date is not nearly as important as hitting your ramp-up curve, and operations will have the best insight on how that looks.

It is unsurprising to us that in smaller organizations, leadership is more hands-on and involved in setting the final dates—around 60% of the time. As organizations grow larger, and there is more internal expertise, the prominence of executive involvement goes down by half, and the involvement of other departments rises significantly and at a very similar rate to reach 30% to 40%. This is also an effect of scale and the need to delegate, as companies may be managing hundreds of projects per year, and leadership can only weigh in on the largest or most important.

JIM VORTHERMS
SENIOR DIRECTOR,
CONTROL SYSTEMS INTEGRATION

"Sometimes you have a project that simply cannot be late. In those cases, we need conversations around staying on track or getting there."

Figure 3.1 | Phase Saleable Product Date Is Set

"At what point in the project lifecycle do you finalize your saleable production date?"

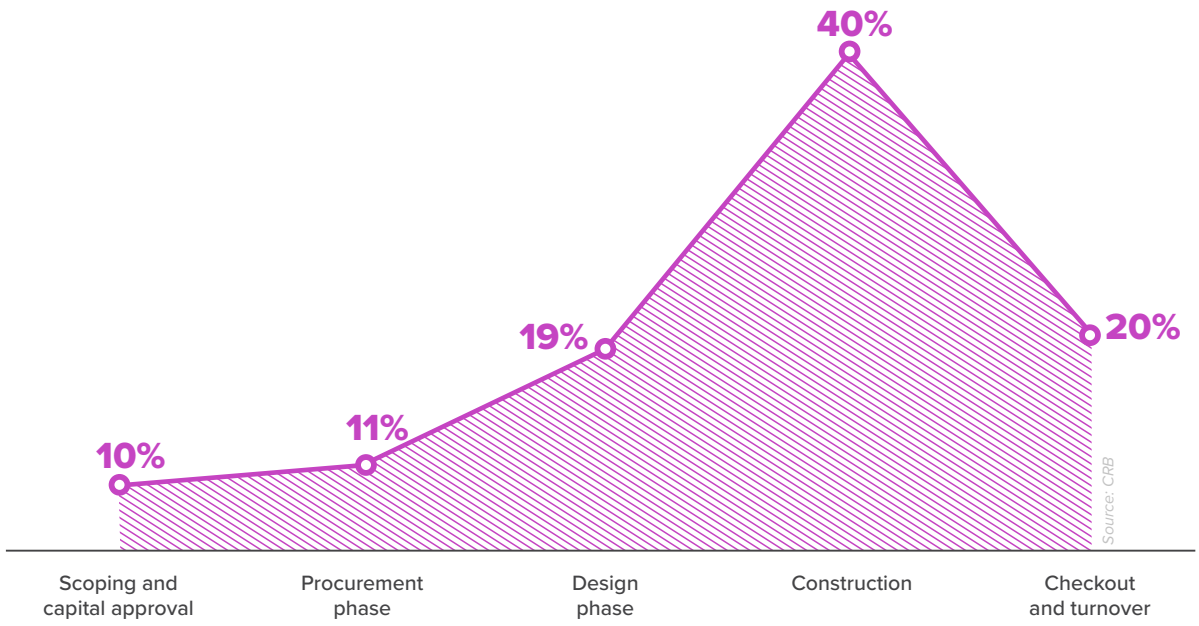
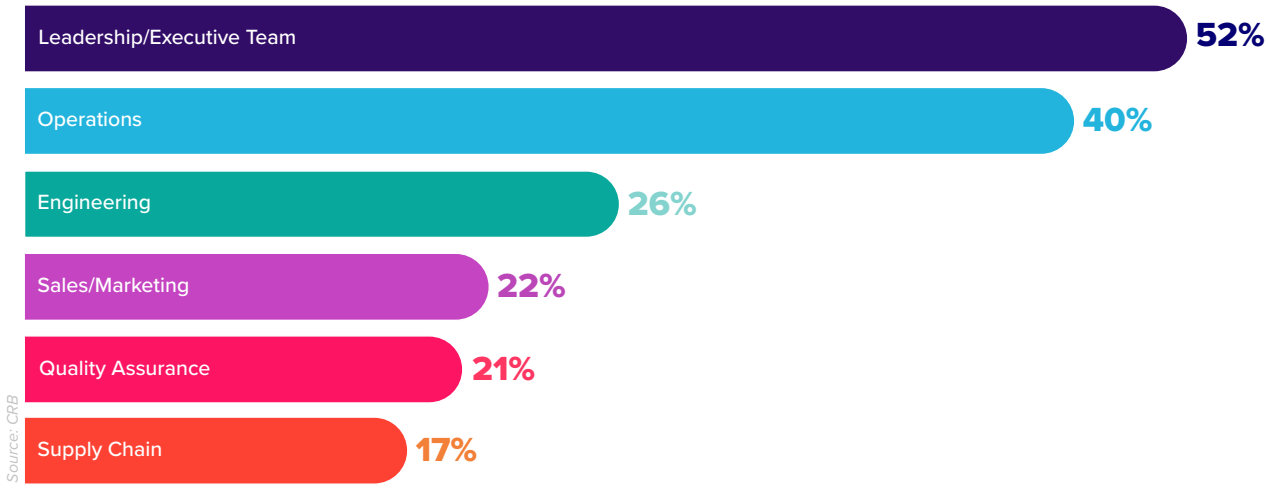


Figure 3.2 | Responsible for Setting/Adjusting Saleable Product Date

"Who is responsible for defining or adjusting the saleable production date in your organization? (Select all that apply)"



Finding out you might have a problem

The success rates here represent real business impact. Capital investment demands certainty. As we have discussed, being first to market will define market share, and meeting your target date can determine when your project meets its ROI projections… or if it ever does.

If there's a single data point that captures how much room the CPG industry still must improve the project process, this might be it. While no good engineer expects 100% success, we anticipated fewer organizations struggling and many more of them consistently hitting their target dates.

Interestingly, these results are not a function of organizational size or sophistication. They remain remarkably consistent from startups to large corporations. Companies in the middle $50M to $500M range are an exception, reporting that they are much more likely to **miss their target dates 75% or more of the time.** This could be a result of these companies having a wider variety of projects but not applying a fully mature project process to each of them.

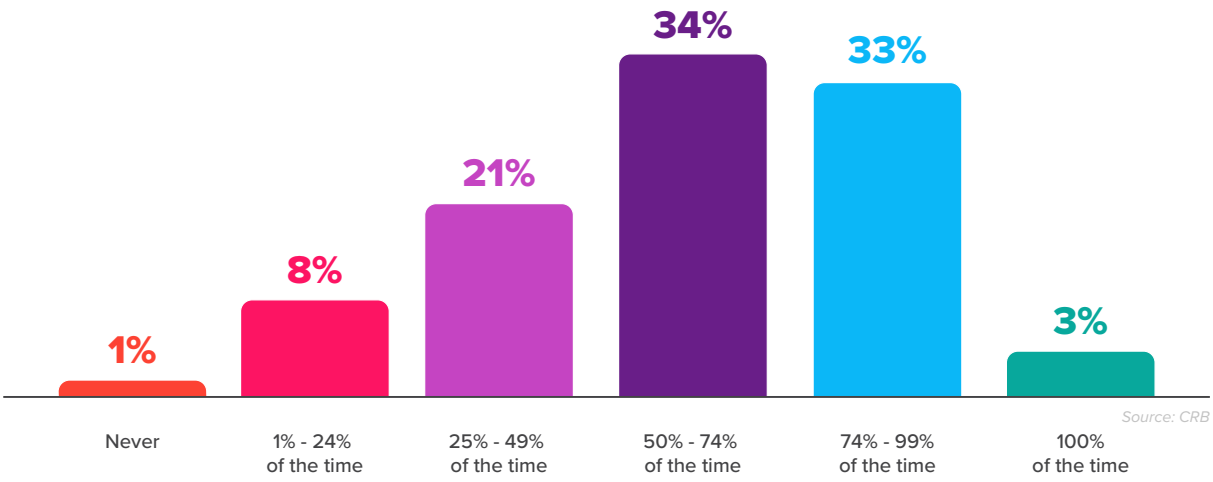
Overall, these results signal the need for several key aspects of operational readiness, including more rigorous planning, earlier engagement, and stronger cross-functional collaboration. For many CPG companies, consistently hitting production dates isn't just an improvement—it's a powerful competitive advantage.

30%

of survey respondents are meeting their initial target date less than half of the time. Without detailed operational readiness plans, defined team roles, and process checklists, it can be hard to diagnose, much less solve, this kind of challenge.

Figure 3.3 | Frequency Hitting Target Saleable Product Date

"How often do you meet your initial target saleable production date?"



Keeping track of commissioning success

Had it been an option, we think respondents would have most likely chosen “all of the above” for which metrics they track for commissioning success (Figure 3.4). All are important, but not necessarily in the same way. Safety and quality compliance are “must-haves,” and so perhaps they are not measured beyond falling below 100% (or nothing else matters). Really, the most surprising aspect is that production output metrics are not 100%. This might be a result of respondents only choosing one option instead of the maximum of three or might reflect their specific roles in the organization. Smaller organizations ranked employee feedback higher, likely due to their more informal nature. Bigger companies skewed more toward output metrics, data collection, and integration performance.

When it comes to what is most important, startups tend to prioritize staying within budget more than larger companies, which were much more likely to prioritize meeting production ramp-up timelines. The leading metrics here, quality consistency and achieving production capacity, probably reflect the challenges most often faced by respective organizations in their projects (Figure 3.5).

Figure 3.4 | Tracked Within Commissioning Success

“Which categories does your company measure when tracking commissioning success? (select up to three)”

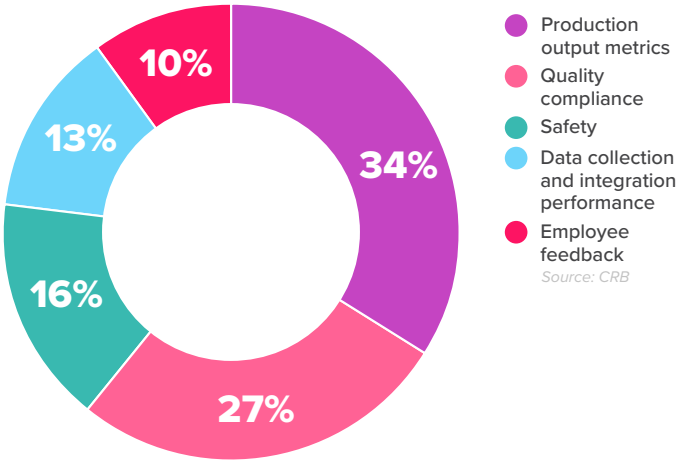
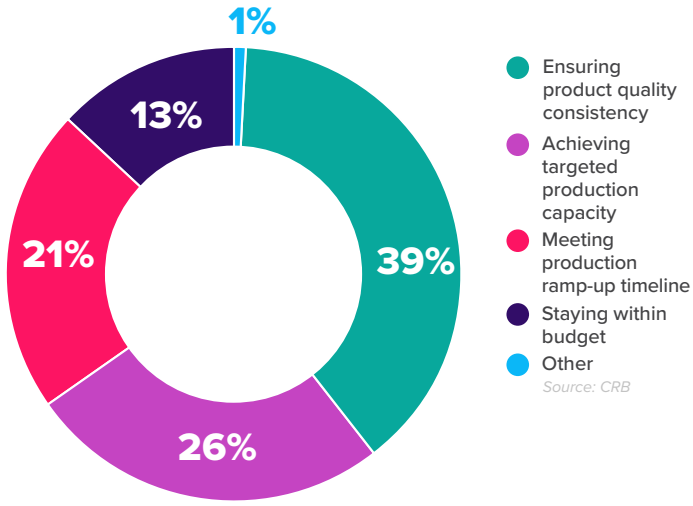


Figure 3.5 | Most Important Metric for a Successful Commissioning

“What is your most important metric for achieving a successful commissioning process?”



42% of companies > $1B chose product quality consistency

23% of startups < $9M chose staying within budget

8% of companies > $500M chose staying within budget

Where do delays come from? And which hurts the most?

When asked about the top three most frequent causes of commissioning delays, the leading answers were all foundational to operational readiness and how you execute a project. These are indications that the planning foundations were incomplete or inaccurate, and unexpected delays are translating into real costs for CPG manufacturers. Coordinating with stakeholders to ensure all relevant parties are fully engaged throughout the project is one of the best ways to keep your project on track.

Construction contractor delays were more common among smaller companies. The cause can be traced all the way back to Figure 1.1, where these same companies were more likely to start operational readiness planning later, sometimes only after construction began.

There is also evidence here that partners are present, but not properly engaged in the project process. **OEM vendor delays** were significantly higher for larger companies, particularly over $1B in revenue. This contrasts with the fact that these groups were much more likely to 'often' or 'always' involve OEMs in their operational readiness planning. Similarly, **supply chain disruptions** seem to hit smaller companies a bit harder than the larger ones, even though smaller companies reported to 'often' or 'always' involve external Supply Chain/Logistics groups in operational planning. In our experience, these problems can also be a symptom of too many overlapping partners without defined roles in the process.

Process validation challenges most often indicate delays or scheduling constraints elsewhere in the project. Sometimes, the cause is more fundamental, such as deficient system design or an OEM not fully capable of delivering on performance expectations. In the field, we still see OEM delays for large owners despite early and frequent engagement in planning.

MONTE VANDER VELDE
SENIOR PROJECT MANAGER

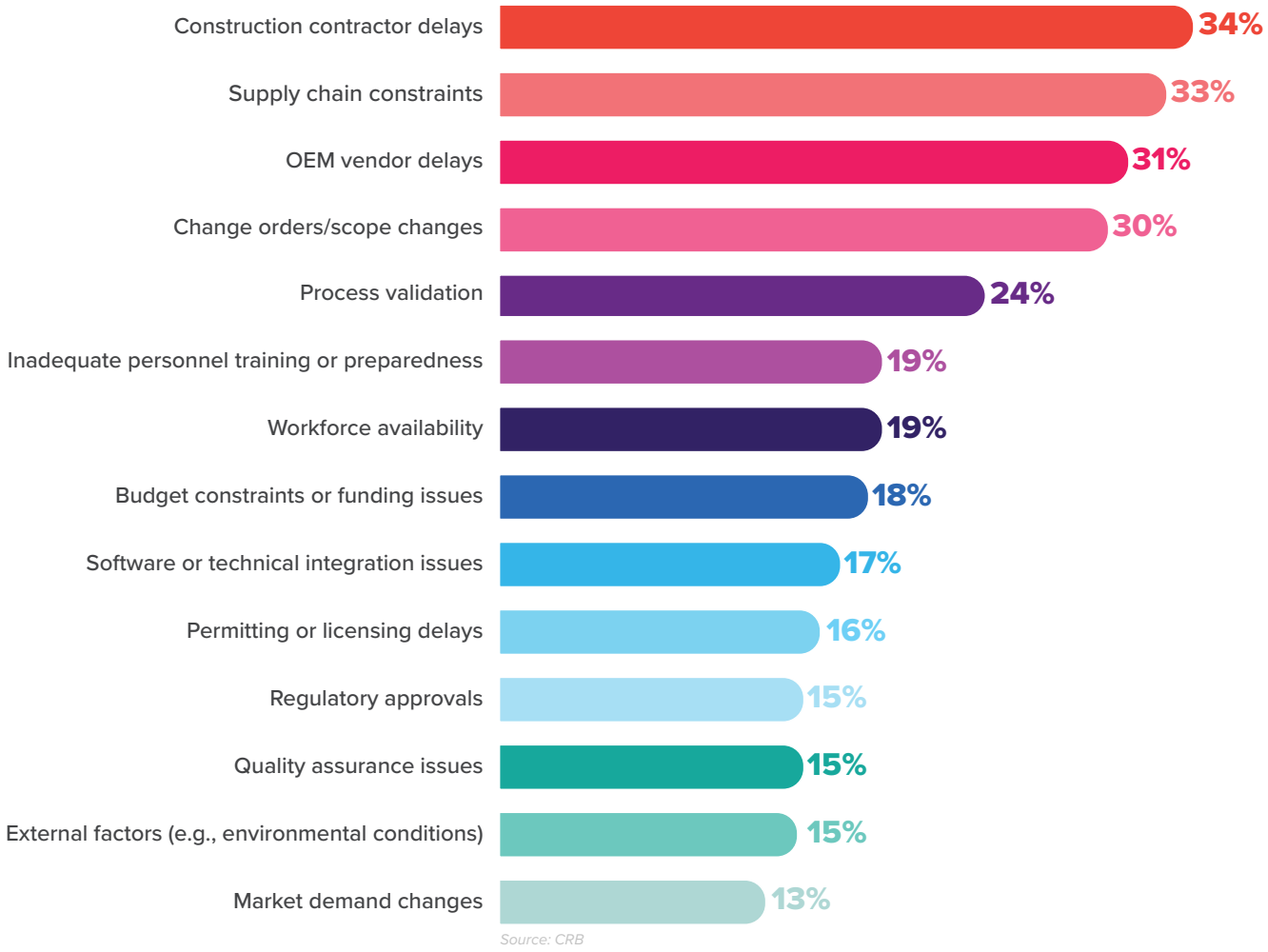
"Focusing too hard on your saleable date may lead to compromise elsewhere, sacrificing your ability to meet your rate over the first month...or even year. Sure, you are putting product in bottles, but also just created a huge headache for yourself. Be sure to measure, weigh, or run a simulation to understand the value of one missed target over the other."

This may be due to more aggressive timelines in the base schedule and possibly higher levels of automation complexity. In ambitious projects, you can never control 100% of the variables. You can only try.

When respondents were asked to rank their top three choices in terms of impact, budget constraints and permitting/licensing delays rose to the top. We understand this to reflect how painful these issues are in terms of overall project success, and that these issues are side effects of earlier-stage planning and risks. Budget challenges at the beginning of commissioning could indicate inadequate scoping or unrealistic expectations from the very start of the project. Permitting challenges often arise when the relevant authorities were simply engaged too late. Both can be indications that the right people were not at the table during the planning stage.

Figure 3.6 | Top Causes of Commissioning Delays

"What factors most frequently cause delays in commissioning? (Select your top 3)"



Source: CRB

NOT ENOUGH OF A GOOD THING: PEOPLE

Sometimes the appearance of cross-functional collaboration can be deceptive. All the right people are at the table, but the budget did not allow them to devote sufficient time to the project. Having someone for one day a week may be functionally the same as not having them at all.

Figure 3.7 | Target OEE Ramp-Up for Highest-Volume SKU

"For your highest-volume SKU, how long does the ramp-up phase usually take to achieve the target OEE?"

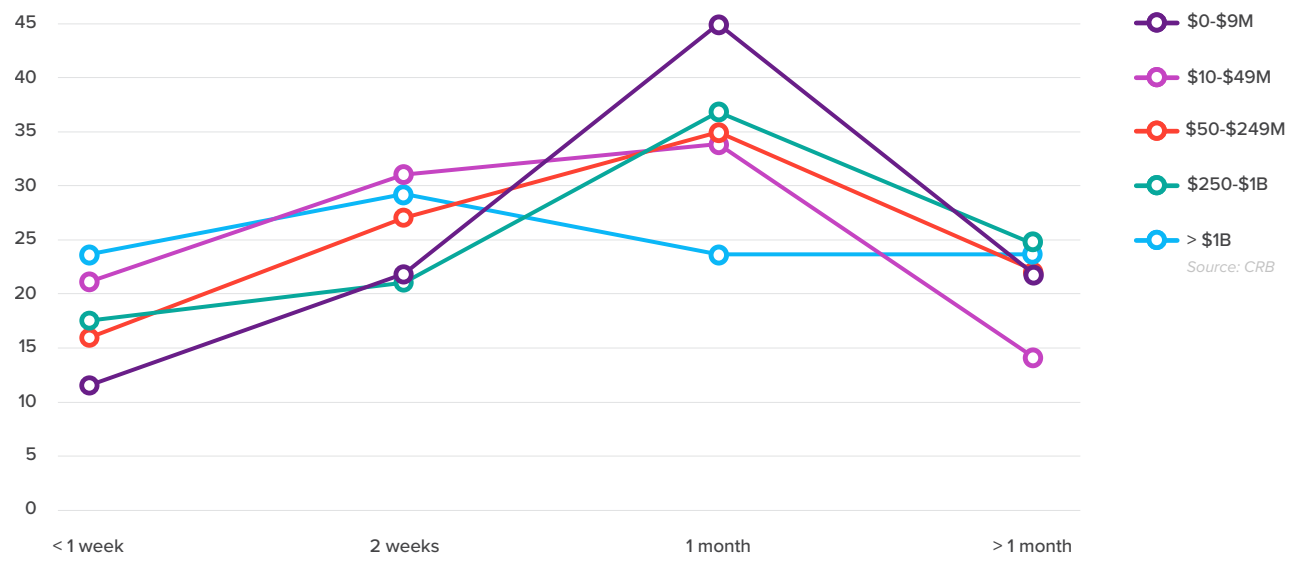
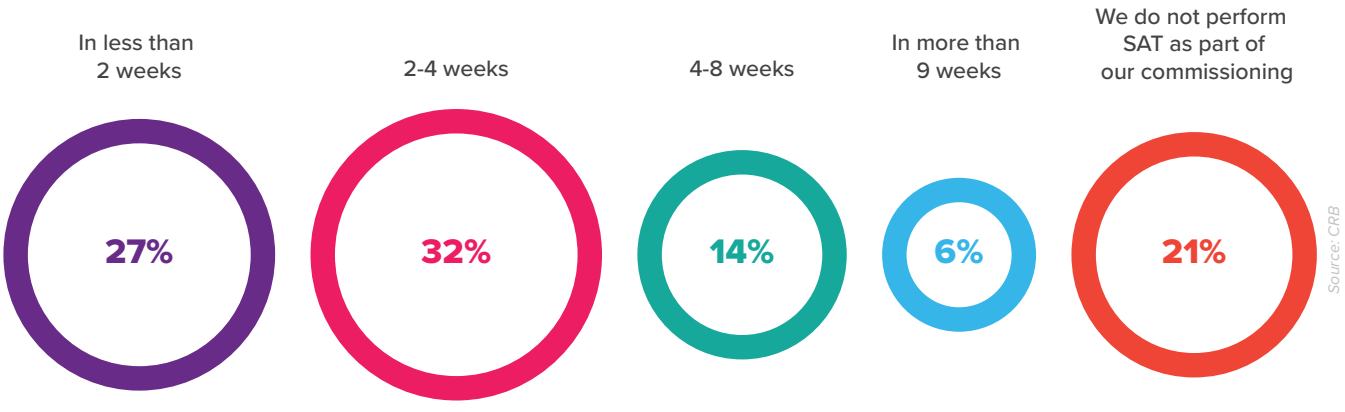


Figure 3.8 | When SAT is Performed for Commissioning

"When do you perform a site acceptance test (SAT) as part of the commissioning process?"



38% of companies smaller than $10M do not perform SAT

6% of companies larger than $1B do not perform SAT

47% of companies larger than $1B perform SAT at 2-4 weeks

When companies are meeting key milestones

We would typically expect the product lines for the highest-volume SKUs to be addressed first—but to take the longest. High-capacity lines are often the fastest, taking longer in testing and optimization to get to OEE. Larger companies skewing longer in ramp-up probably reflect more complex production lines, but also more processes and caution (Figure 3.7). For all companies together, one month is the most common, and all companies see similar rates of a month or more.

Overall, SATs are often performed quite early in the commissioning process (Figure 3.8), which we believe is driven by the high number of smaller-budget, lower-complexity projects that respondents reported. Looking deeper, we see that these results highlight how different the schedules and expectations can be for the smallest and largest CPG companies. For companies with less than $10M in revenue, the number that do not perform SAT jumps to almost 40%. For everyone else, it is close to 15%.

Companies $1B+ are

2x as likely

to perform SAT in nine weeks or more.

Strategies for success: Optimizing the commissioning process

It is good to see that respondents heavily favor proactive and close collaboration of different teams (Figure 3.9), with this trend becoming stronger as company size increased. This reflects what we have seen back in the planning stage (Figures 1.7, 1.8) with enthusiastic inclusion of operations, OEM vendors, control systems integrators, and other internal teams. The fact that using external consultants is the least popular strategy for optimizing the commissioning process seems to echo the results that external supply chain and Commissioning, Qualification, and Validation (CQV) experts are not included in the earlier planning stages. Perhaps some of those teams or experts are left out of operational readiness planning altogether. Also, we are concerned about the negative-to-ambivalent perceptions of each of these strategies—what is going wrong there? Who does not want operations involved?

The fact that equipment and supply chain challenges figure so prominently at the commissioning stage indicates that a change of perspective may be in order. Even if a specific team's main contribution is expected at the end, bringing them to the table in the beginning may greatly increase the overall value they can provide. Delays and changes at the commissioning stage often indicate that key information was missing from the project plan. On the other hand, not all consultants have the holistic view and proven expertise to properly help commission a line and deliver certainty of result.

It is clear in Figure 3.10 that each company faces a wide range of challenges, varying by company size and project complexity. 30% of startups were much more likely to cite cost control as a key problem, where the average quicky dropped to 14% for companies over $50M in revenue. Still, of those that selected cost control, almost half considered it their most acute challenge, serving as a warning for other organizations to avoid it as much as possible.

Larger companies, those above $10M in revenue, cited slightly different issues, making workforce turnover a top three issue. The very largest companies were less likely to see process inefficiencies or raw material inconsistency, indicating that process controls and more sophisticated project management helped prevent them.

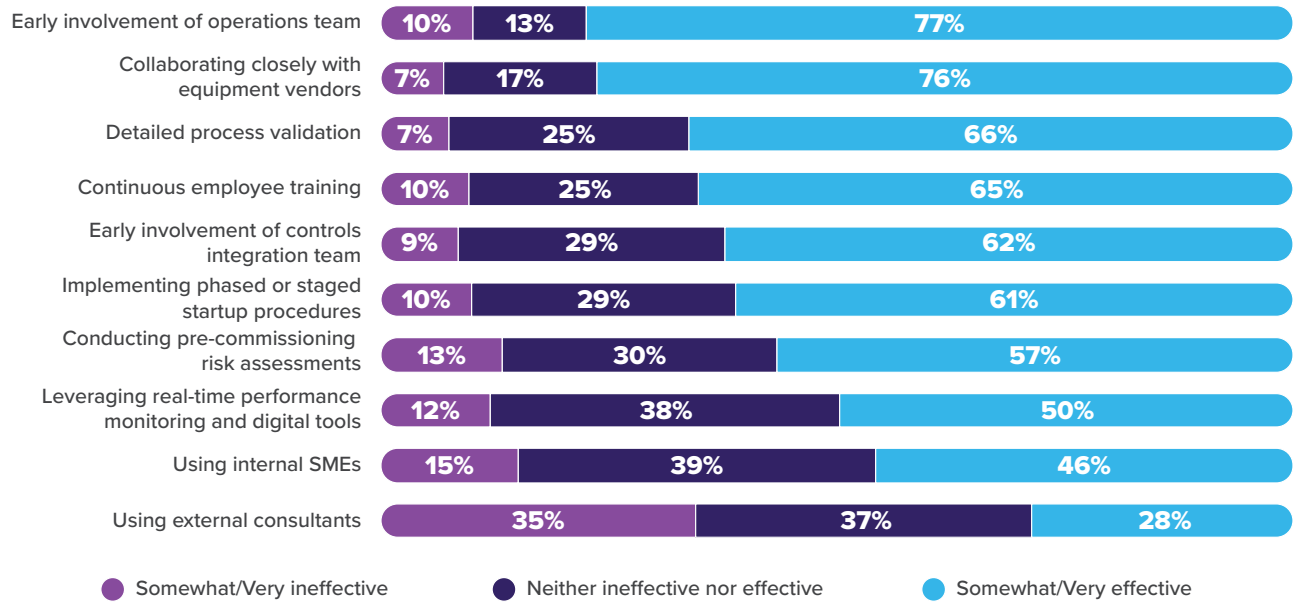
KEY TAKEAWAY

EXPERT INTERNAL RESOURCES AND PROCESSES DELIVER VALUE FOR THE BIGGEST COMPANIES

Companies over $1B in revenue were up to 3x more likely to find more sophisticated strategies like real-time monitoring tools, staged startups, and internal SMEs "very effective." While smaller companies may not have immediate access, consider the value in developing in-house capabilities or leveraging similar expertise from outside groups.

Figure 3.9 | Effectiveness for Optimizing Commissioning

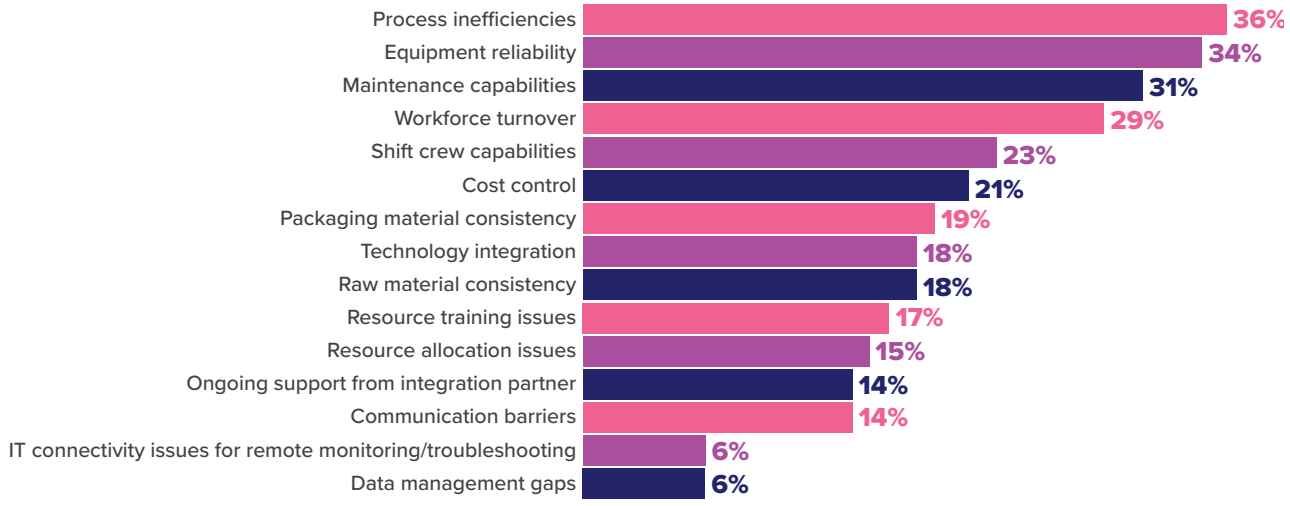
"How effective are the following strategies in optimizing your commissioning process?"



Source: CRB

Figure 3.10 | Top Operational Efficiency Challenges Post-Startup

"What are the top three challenges your company faces in sustaining operational efficiency after startup?"



Source: CRB

“You cannot start up a new production line with all new people who don’t even have basic cGMPs. That is a recipe for failure.”

— Leader in CPG Manufacturing

Companies with $250M to $1B in revenue were more likely to cite equipment reliability, and for those that ranked equipment reliability as a top three challenge, many ranked it #1. For larger companies, we often find the root cause related to the high-speed nature of the application, inconsistent inputs such as packaging materials, or untrained operating and maintenance teams. These responses may also come down to the nature of the problem: if your equipment is not working, that is all that matters in the moment.

"My preferred way to choose consultants is to check their references. Are they familiar with the exact problem we are trying to solve? How did the last project go? Who did they work with?"

— Stig Bockman-Pedersen

SKILLED LABOR SHORTAGES AND HIGH TURNOVER

It seems that more nuanced challenges like consistency or capabilities are rarely considered a chart-topping issue but are consistently high for all categories. Across all respondents, the availability, capability, and retention of labor was a frequently cited challenge.

Qualitative interviews revealed how difficult this can be to diagnose. Is the training insufficient or is the equipment hard to use? Is hiring a challenge or is turnover too high? Either way, respondents often felt that operators lacked the technical skills to manage modern equipment effectively. High turnover rates are a problem, especially among newer employees, making it difficult to build consistency or long-term operational and maintenance knowledge. It is very possible that the top five challenges that respondents are citing in Figure 3.10 can all be traced back to training and retention!

Making readiness real: Recommendations for commissioning and beyond

CPG manufacturers are facing unprecedented pressure to optimize operations, minimize time-to-market, and maximize returns on capital investment. Operational readiness is the industry's response to this call—a structured approach to bridging the gap between capital expenditure and full production efficiency. Like every other section in this report, the value of readiness should connect back to meeting OEE targets, improving ROI, and avoiding The Dip. Many of our respondents found that these challenges are solvable with earlier stakeholder collaboration, structured approaches, and a more realistic acknowledgment of team and workforce realities. This marks a transformative shift in how manufacturers prepare for success.

Operational readiness is no longer just about having the right equipment; it is about having the right ecosystem, built on collaboration, communication, and continuous improvement. This shift requires cultural change within both OEMs and end users, a willingness to invest in foundational capabilities, and a shared commitment to long-term success.

Track the delta between your dreams and reality

Companies of all sizes report setting initial production dates at a wide range of project stages, from pre-approval to startup. There is not a universal answer for every project, but you should know how well you are doing. Keep track of how often those initial dates track with true end dates to find ways to bring more surety to your capital projects.

Consider an integrated team

It may feel like overkill to invite everyone to planning, but it often pays off in a big way by the time you are explaining startup results to executives. Modern capital projects, even small ones, are too complex to be captured by any one person or department. Dividing and assigning tasks and responsibilities to a team of experts at the beginning is an investment in your future success (and sanity) that we cannot recommend enough.

Always start planning earlier than you think you need it

As much as we see respondents praising early comprehensive planning, we also do not see complaints about it. When we see so many problems with later-stage, reactive planning that leads to execution inefficiencies, training gaps, and delays in production ramp-up, we think that earlier should always be an option.

Build checklists around equipment and systems, not people

So often we see maintenance staff given individual checklists, broken down by equipment. As those lists are completed, it does not mean that the equipment is ready, because other people also have their own checklists for that equipment. You may know if someone is doing their job, but it is much more difficult to know what you want to know: is that equipment ready? Did you put oil in all 22 gearboxes?

With comprehensive equipment and system checklists, you can quickly derive a very high level of confidence that, when you walk over to it, a piece of equipment is really constructed and commissioned correctly. It is a newfound peace of mind that we promise you will remember.

Let people get their hands dirty

> *"We don't want server fault code 22 on the screen. We want to know what caused it and what to do about it. Operators need to fix it fast without calling engineering."*
>
> *— Leader in CPG Manufacturing*

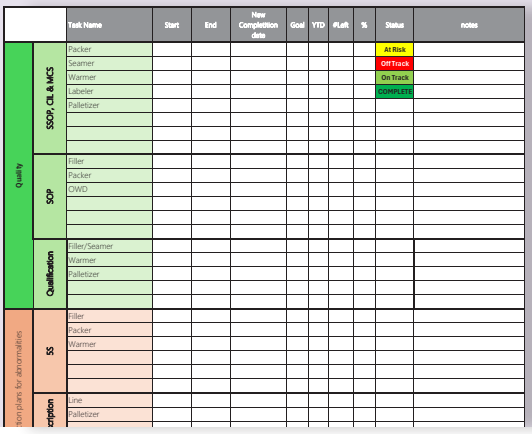
In-the-field training remains an important complement to simulations and classrooms. Hands-on training with real equipment is a great way to not only transfer knowledge but build a problem-solving approach that's informed by the deep experience of the trainers. This ideally can start as early as the commissioning process while working side-by-side with the OEMs.

You could ask for more from your OEMs when it comes to interfaces

It is a feature of modern life that HMIs lack standardization, can be confusing, and make training difficult. This directly translates into more training requirements, unplanned downtime, and less flexibility. Involving OEMS earlier, and setting a vision of standardized language, data tags, and integration protocols could lead to less miscommunication and easier transition between systems. You can also ask OEMs to build the training guides along with the HMIs, saving time and ensuring accuracy.

Download our go-to checklists and put these takeaways into action on your next project.

Download the Operational Readiness Template



		Task Name	Start	End	New Completion date	Goal	YTD	#Left	%	Status	notes
Quality	SSOP, CIL & MCS	Packer								At Risk	
		Seamer								OffTrack	
		Warmer								On Track	
		Labeler								COMPLETE	
		Palletizer									
	SOP	Filler									
		Packer									
		CWD									
	Qualification	Filler/Seamer									
		Warmer									
		Palletizer									
tion plans for abnormalities	SS	Filler									
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About this report

Operational readiness—encompassing everything from facility planning and material development to startup and ramp-up—shapes the speed-to-market and competitive landscapes for successful food and beverage manufacturing. CRB's 2025 *Horizons* report captures an industry under pressure from all sides: shifting consumer expectations, regulatory requirements, and a rapidly evolving labor landscape. These forces are pushing manufacturers to elevate their game by optimizing production targets, controlling project costs, and ultimately winning customer loyalty through consistency and innovation.

Amid all this change, one constant remains: CRB's commitment to rigorous data collection and analysis that allows us to capture the insights of hundreds of industry leaders across food, beverage, and consumer product manufacturing. Their input, combined with CRB's deep technical expertise, provides a benchmark view of the sector's top priorities—from facility planning and workforce readiness to automation, material flow, and commissioning strategies.

With 21 offices across North America and Europe, CRB is a leading provider of sustainable engineering, architecture, construction, and consulting solutions to the global life sciences and food & beverage industries. We know the unique complexities of operational readiness for your business and are here to help you. Learn more at crbgroup.com and follow us on LinkedIn for additional industry insight.

Shannah Falcone,
Chief Client Officer

Start your conversation with Shannah and the team now.

authors

Josh Bailey is Regional Director of Commissioning, Qualification, and Validation (CQV) with two decades of project experience in qualification activities, test planning, and coordination. His experience in quality assurance and operations allows him to develop CQV turnover plans with a compliant operational readiness philosophy based on the latest industry guidance and regulations.

Dennis Collins, AIA, brings 40 years of experience in architectural design to his role as Architectural Department Head. Dennis works closely with food and beverage clients to understand their business drivers and leverage creative solutions to deliver safe, lean, and well-organized facilities.

Pablo Coronel, PhD, is a Senior Fellow of Food Processing and Food Safety. He leverages 25 years of experience as a process engineer and food scientist, especially in the development of novel technologies processing and hygienic manufacturing field, to lead clients in product and process design, food safety, and regulatory compliance development. He is a co-editor of the third edition of the “Handbook of Aseptic Processing and Packaging.”

Shannah Falcone, Chief Client Officer, She oversees Business Development, Marketing, and Fellows, ensuring team alignment and innovative ideas that position CRB as a forward-thinking industry leader, premier technical expert, and genuine partner to our clients. Shannah is currently serving her second term on CRB’s Board of Directors.

Matthew Lantzy, LEED AP, Senior Project Director with extensive experience in the design and execution of complex industrial manufacturing projects. His projects range from single production line relocations and installations to larger design-build turnkey projects with capital expenditures of $100 million or more in food and beverage, manufacturing, and consumer products.

Niranjan Kulkarni, PhD, is the Senior Director of Consulting Services, specializing in data modeling operations and process simulations, layout optimizations, and supply chain management. He has worked with pharmaceutical, biotech, food, chemical, semiconductor, electronics assembly, and packaging industries.

Stig Bockman-Pedersen is Senior Project Manager, Qualification, and Validation (CQV) with over 30 years of experience. He is a subject matter expert in Factory Acceptance Testing (FAT) planning and execution as well as a risk-based approach to verification.

Jason Robertson is Vice President of Food + Beverage with more than 25 years of experience in design and construction. He has dedicated his career to bringing innovative solutions to food and beverage clients by leveraging industry expertise and collaborative relationships.

Monte Vander Velde is a Senior Project Manager with an extensive background encompassing engineering, control systems deployment, manufacturing operations, and strategic management. With three decades of experience, he has consistently honed his leadership skills by guiding organizational teams, championing many internal process solutions, and accepting integral roles in the seamless execution of capital projects.

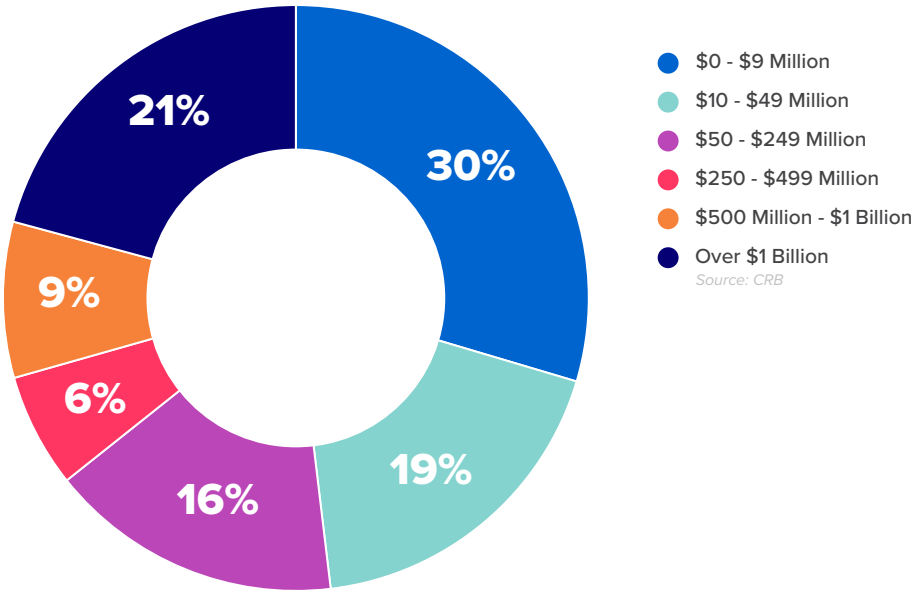
Jim Vortherms, Senior Director, Control Systems Integration, brings over 30 years of control systems programming knowledge, including leading teams and the development of control systems. Vortherms helps clients use and manage data to make smarter manufacturing and equipment decisions. Frequently involved in projects from start to finish, he plays a major role in the scope of work development, scheduling, resource allocation, budget management, and business development support.

Ken VonderHaar is the Director of Client Engagement. He joined CRB after 36 years with Anheuser-Busch and has an extensive background in packaging equipment technology, capital project execution, and construction management. He has successfully implemented over $4B in capital improvements including the development of Anheuser-Busch's operational readiness program for capital projects.

authors

appendix: firmographics

“What is your company's estimated annual revenue?”



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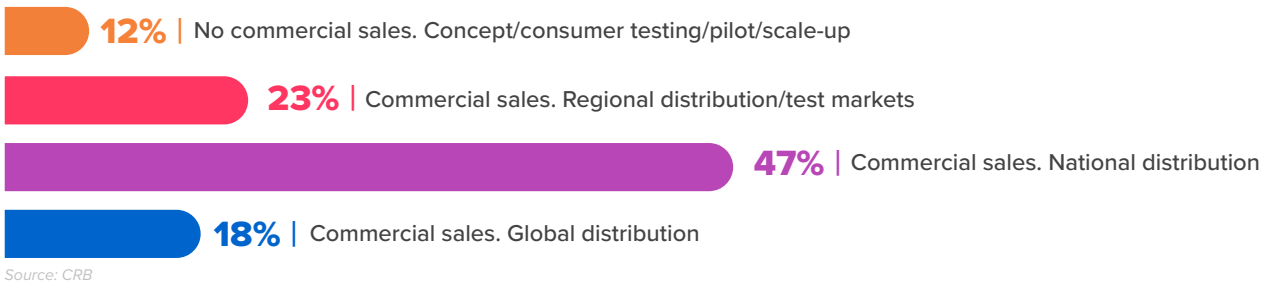
“What percentage of your company's products are currently in each stage of development or distribution? If unsure, please provide your best estimate.”



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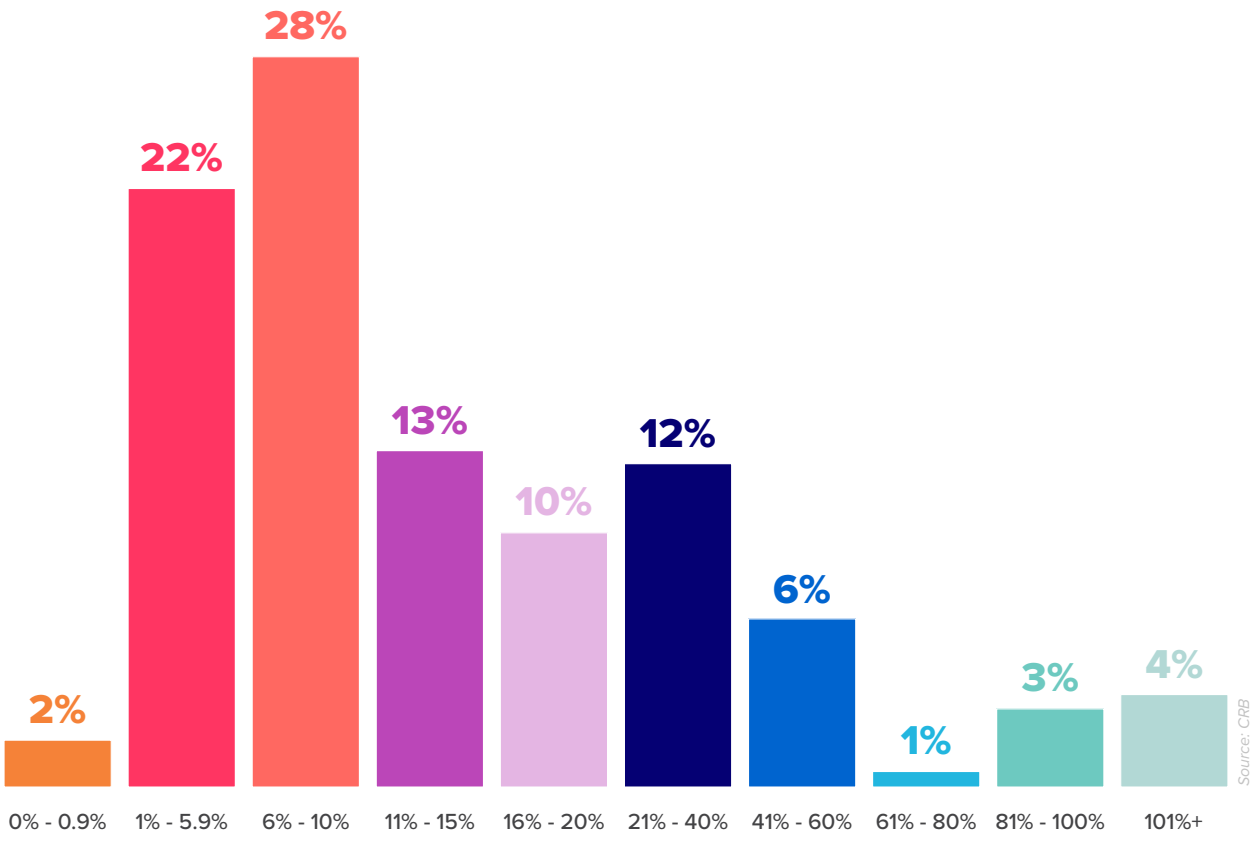
“What is your company's projected annual growth target for the next 3 years? Please provide your answer as a percentage.”



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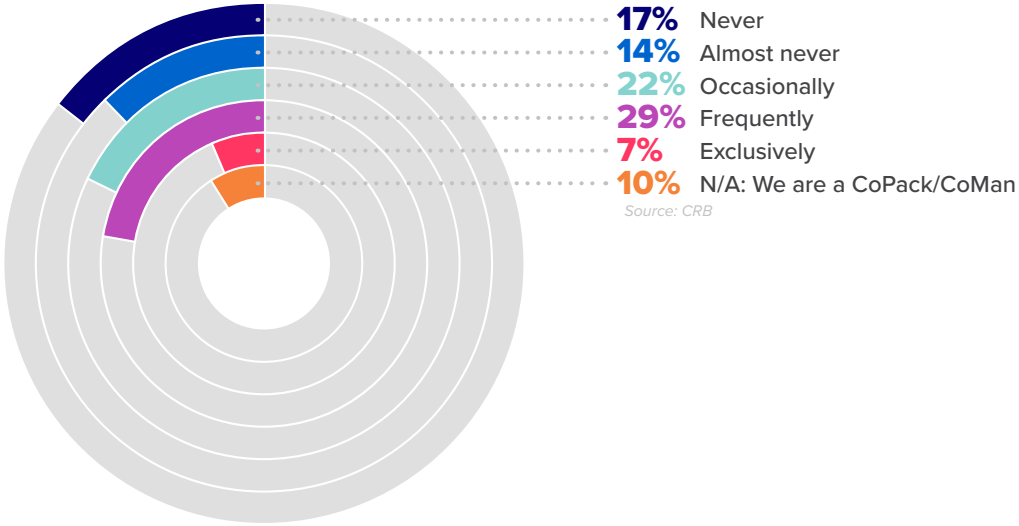
“To what extent does your company **currently use Co-Packaging**?”



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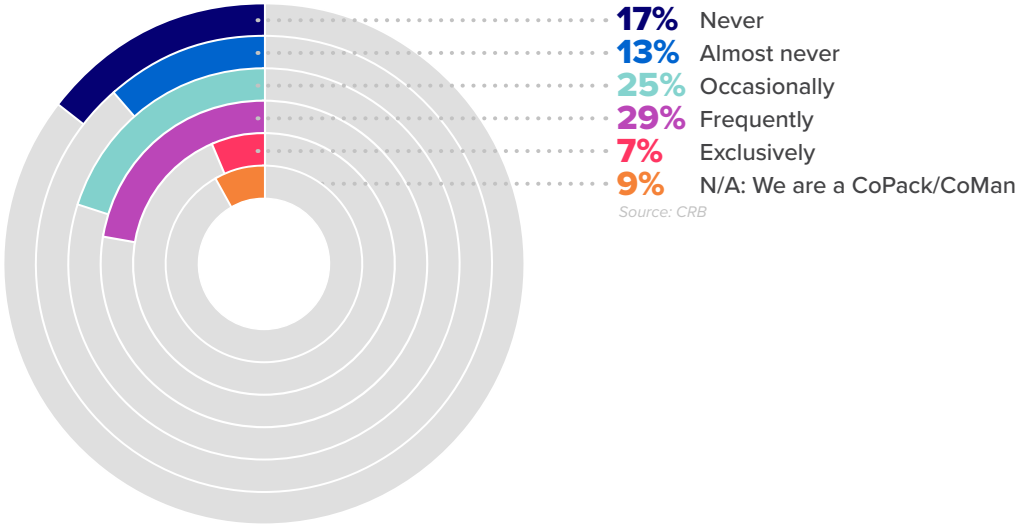
“To what extent does your company **currently use Co-Manufacturing**?”



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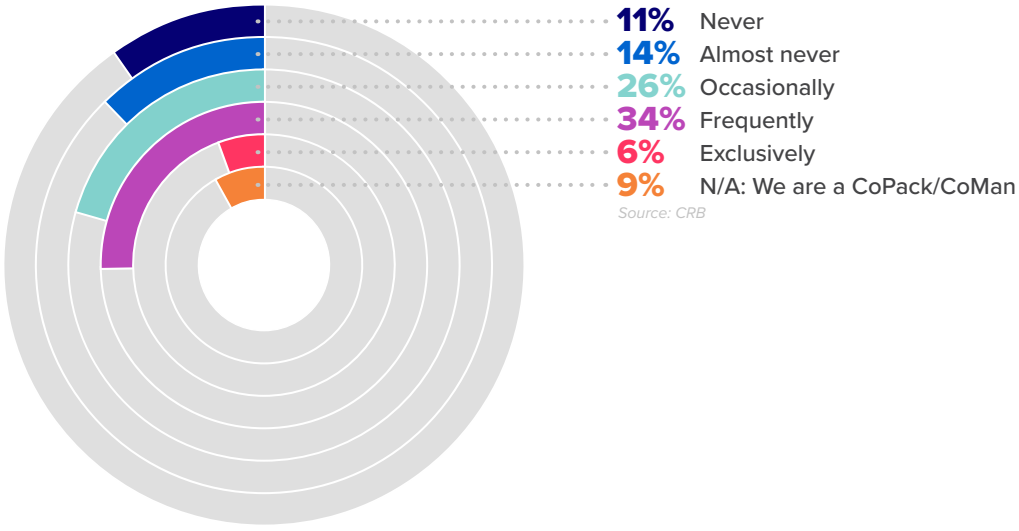
"To what extent does your company plan to use **Co-Packaging in the next three years**?"



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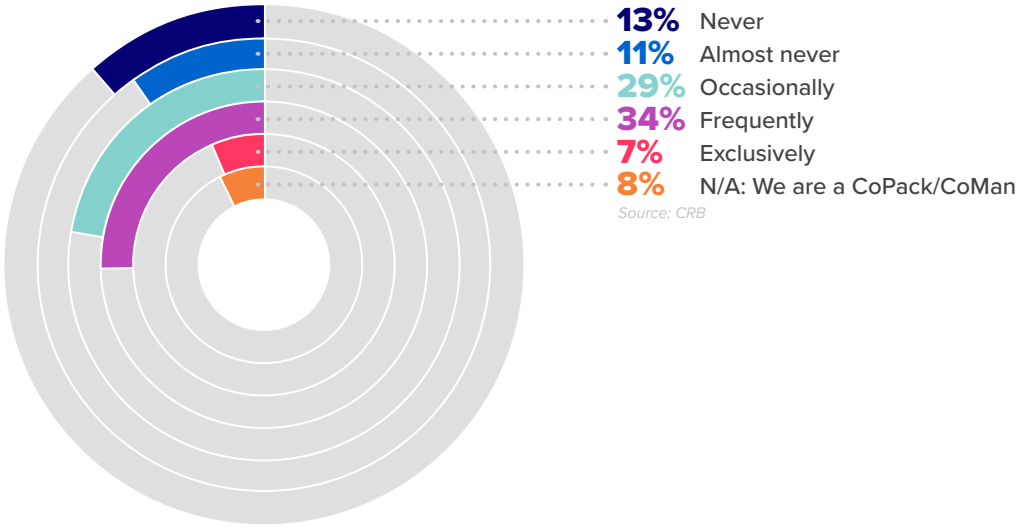
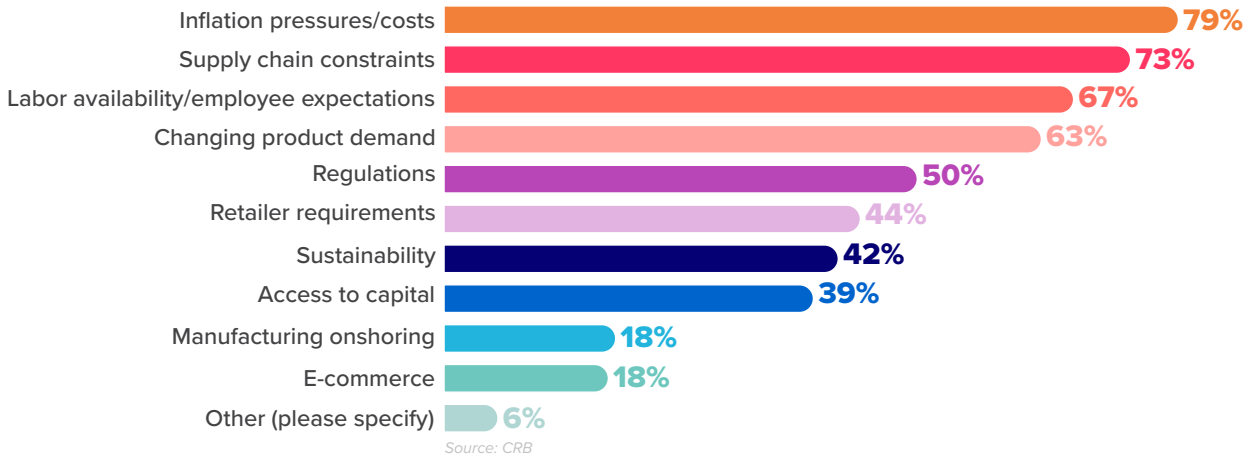
"To what extent does your company plan to use **Co-Manufacturing in the next three years**?"



n=396

“Please select the top 5 challenges your company faces in operational readiness.”



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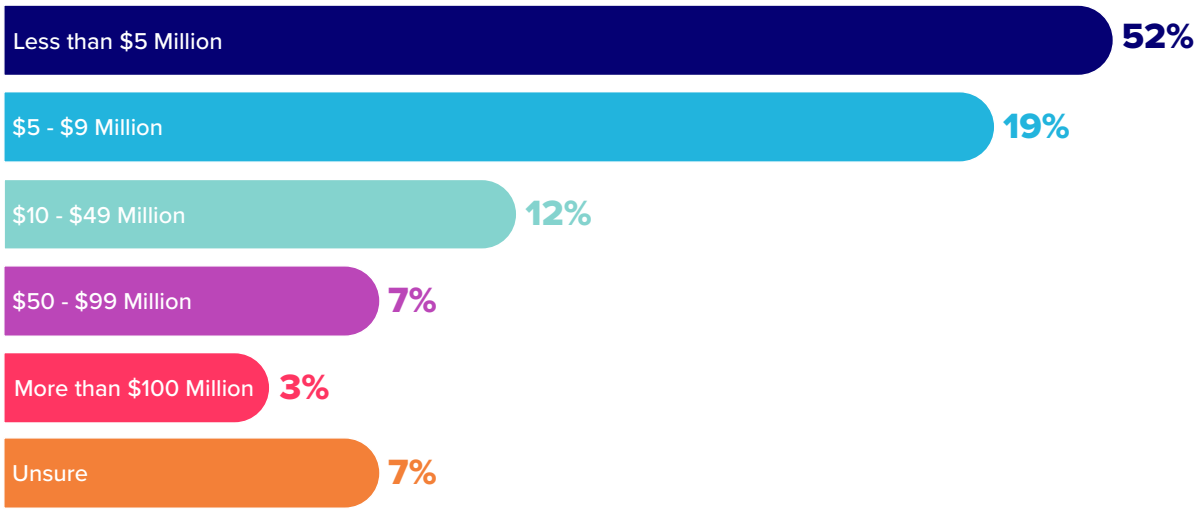
“What is the highest amount your company expects to spend on a single capital project in the next year?”



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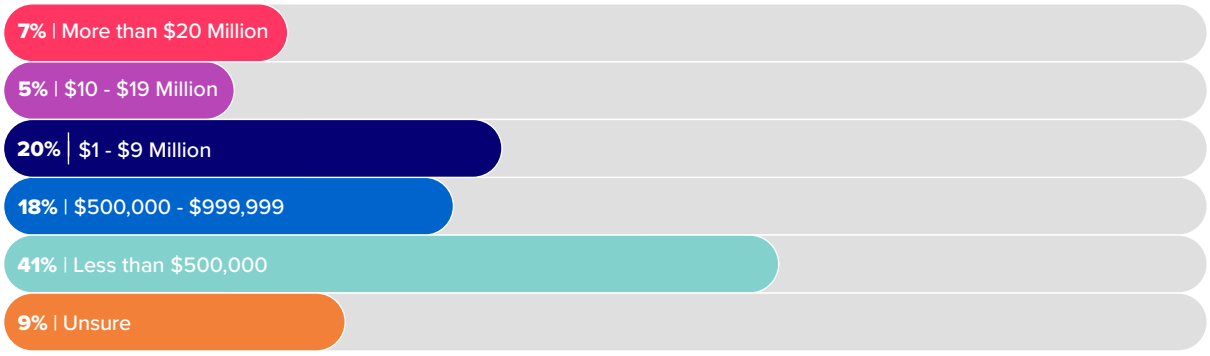
“What is your company’s total annual spending on automation and control system upgrade/maintenance projects?”



Source: CRB

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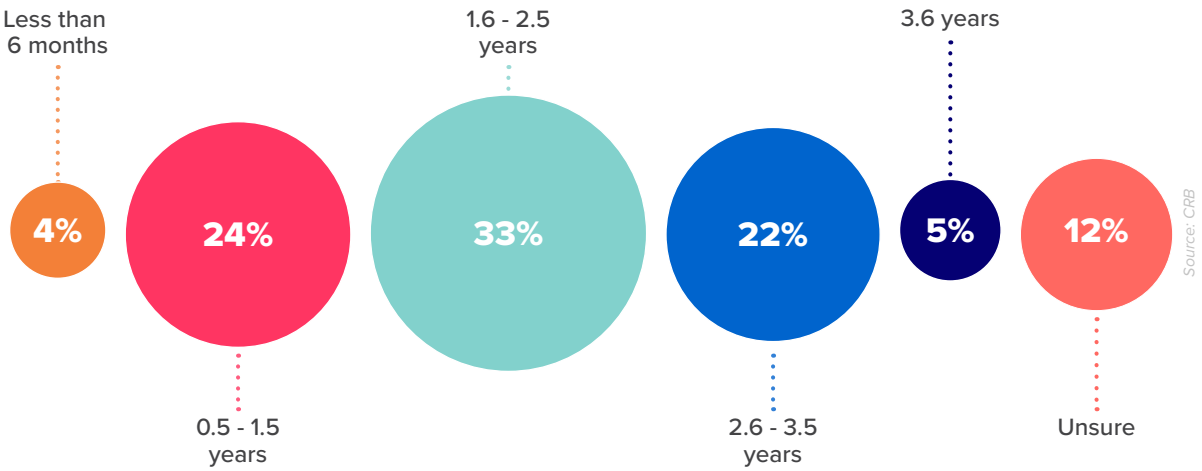
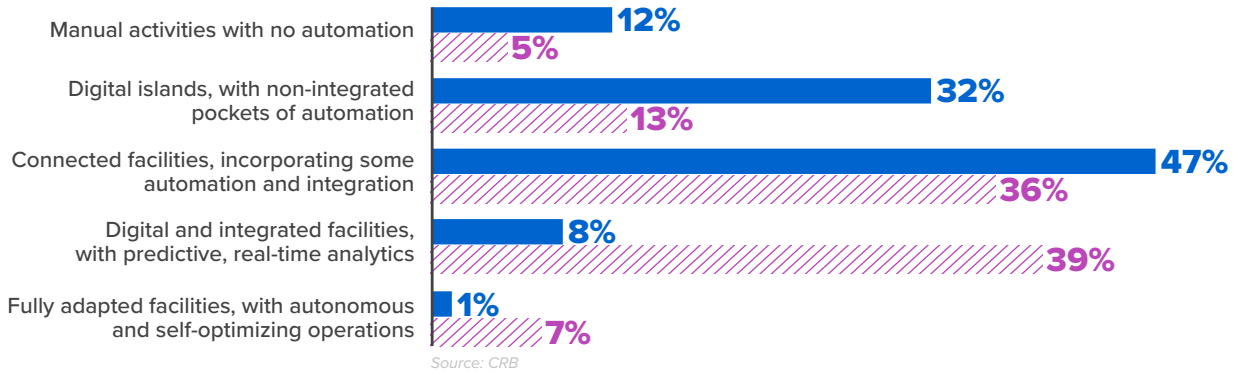
“What is the typical payback period your company requires for capital upgrades?”



Source: CRB

n=396

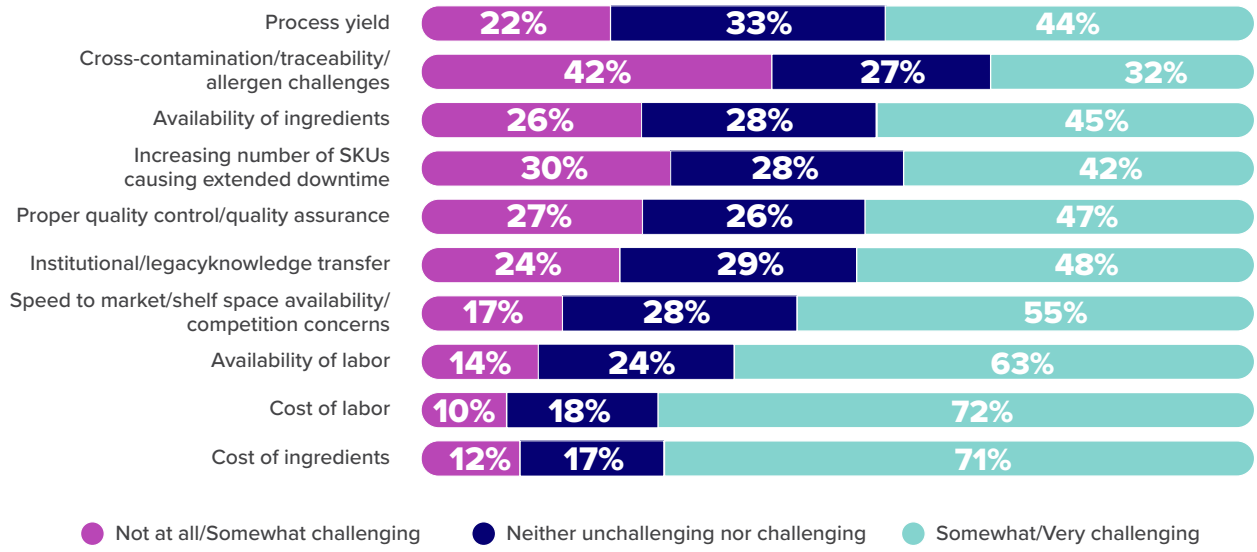
“Which of the following best describes the level of automation your company aims to achieve within the next three years?”



Source: CRB

n=396

“What is the typical payback period your company requires for capital upgrades?”



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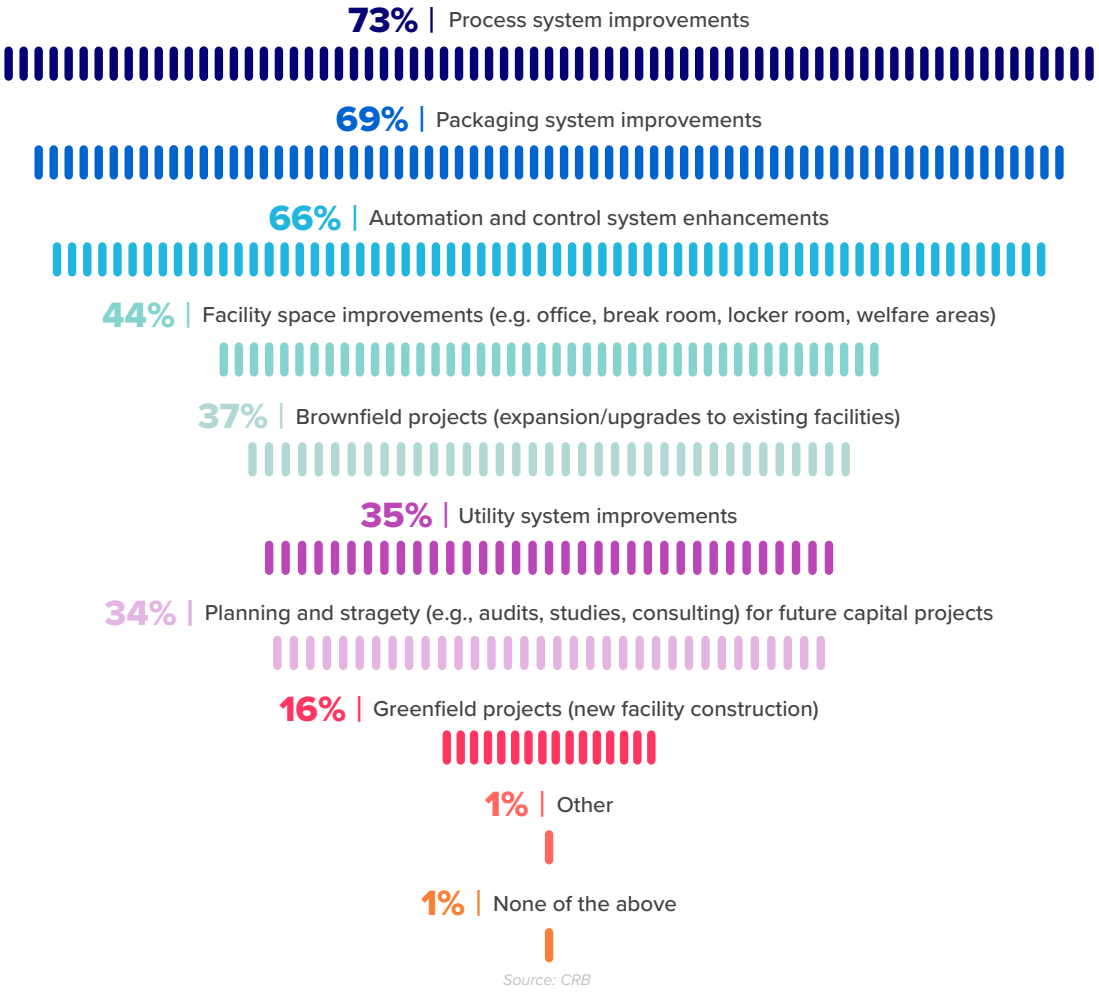
n=396

"Which of the following types of projects are included in your company's capital expenditure plan for the next three years? (Select all that apply)"



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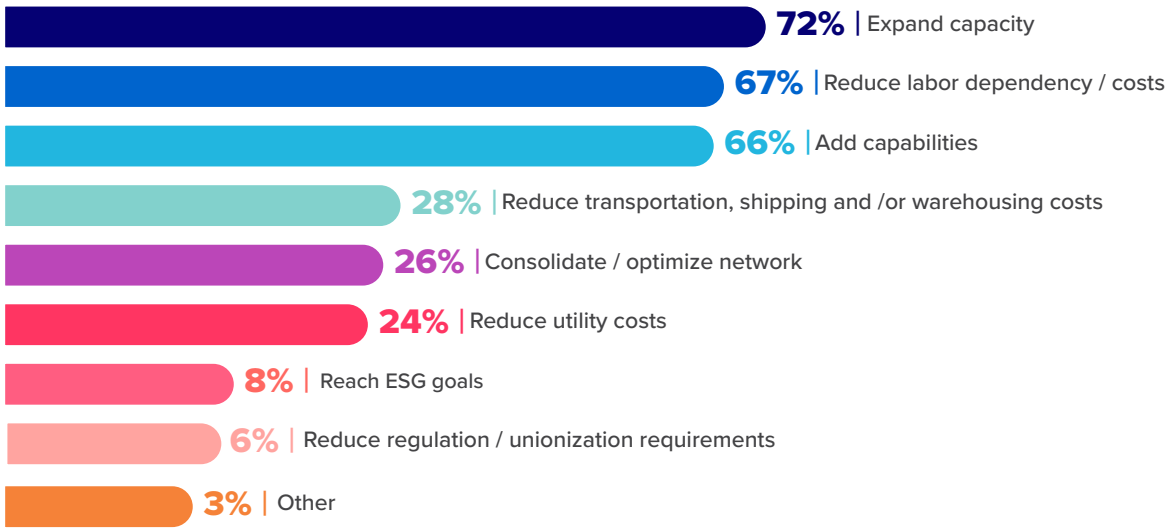
“What are the top 3 drivers for your company’s capital expenditure projects?”



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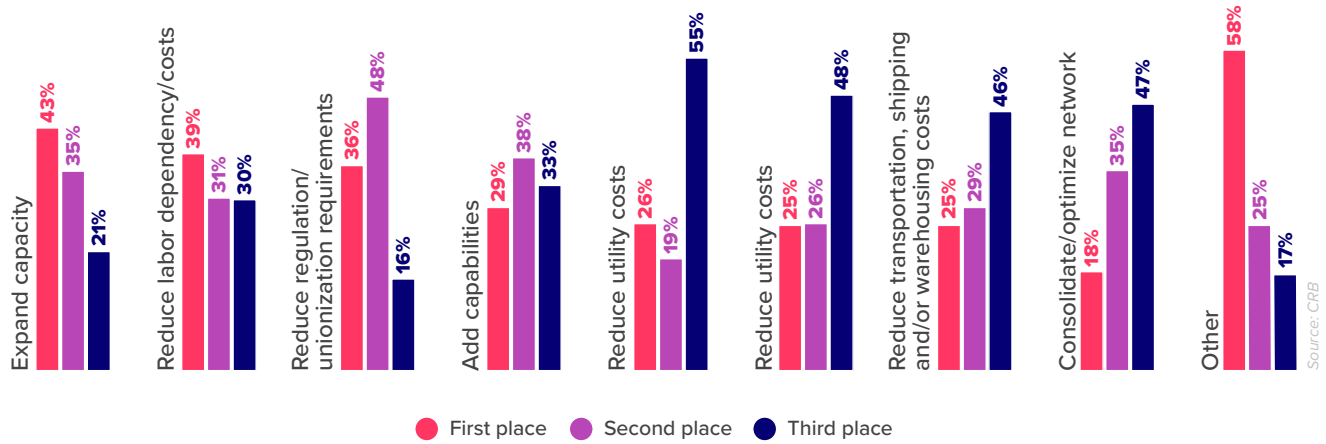
“Rank the top three drivers of your company’s capital expenditure projects in order of importance.”



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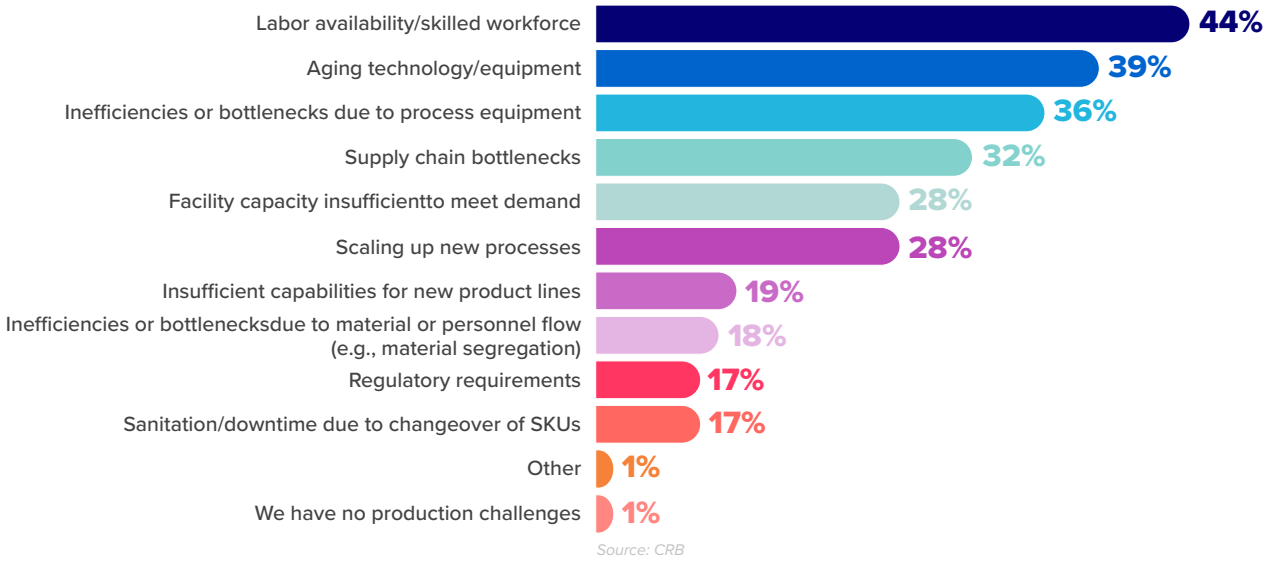
“What are your company’s top production challenges? (Select up to 3)”



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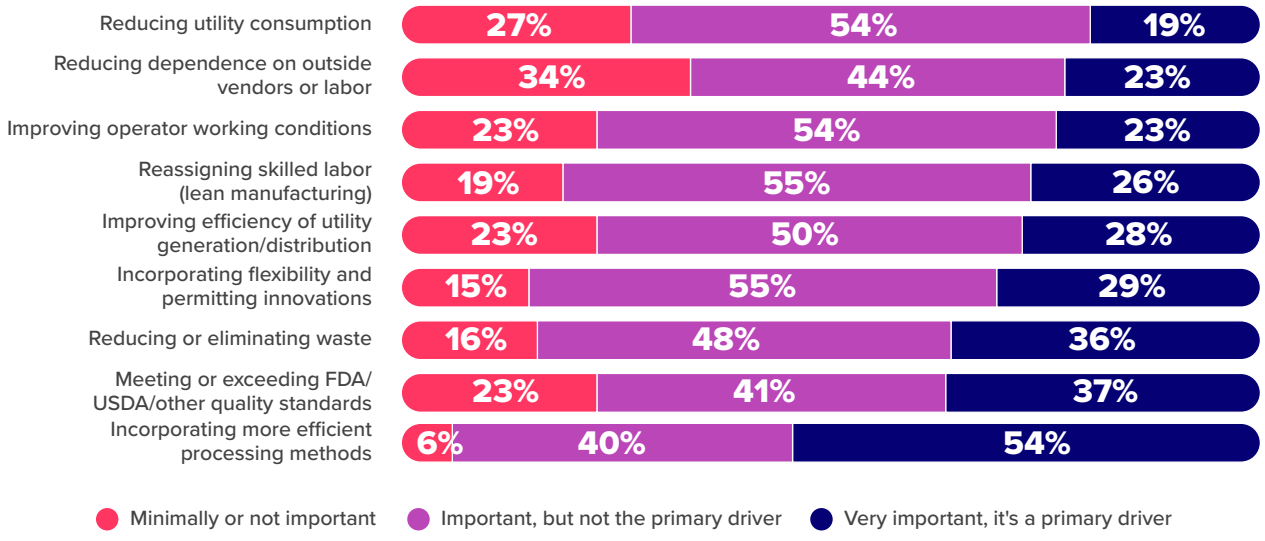
“How significant are the following drivers in executing your company’s capital projects over the next three years?”



n=396

appendix: additional survey data

Figure 2.6 | Developing Operational Procedures

"What are the top primary challenges your company faces when developing effective operational procedures? (Select up to 3)"

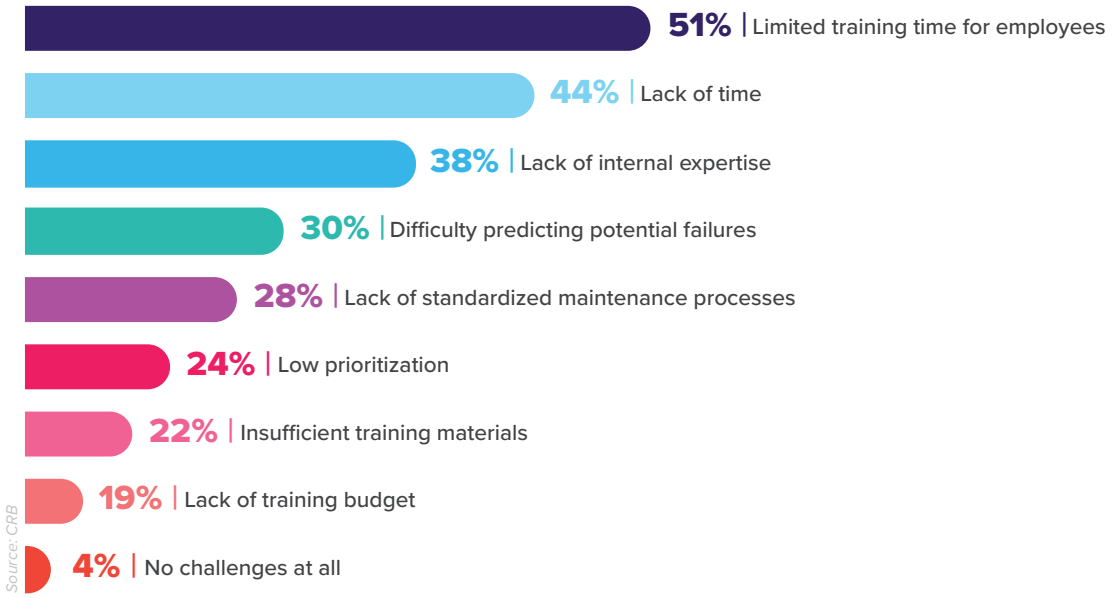


Figure 2.7 | Developing Operational Procedures

"What types of training methods have been most effective for preparing staff to ensure operational readiness? (Select all that apply) "

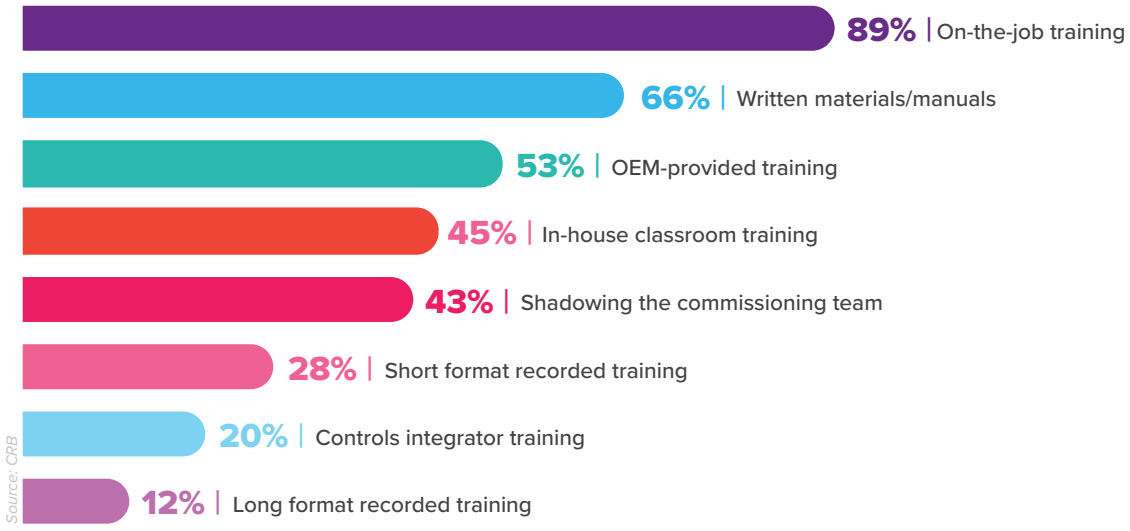
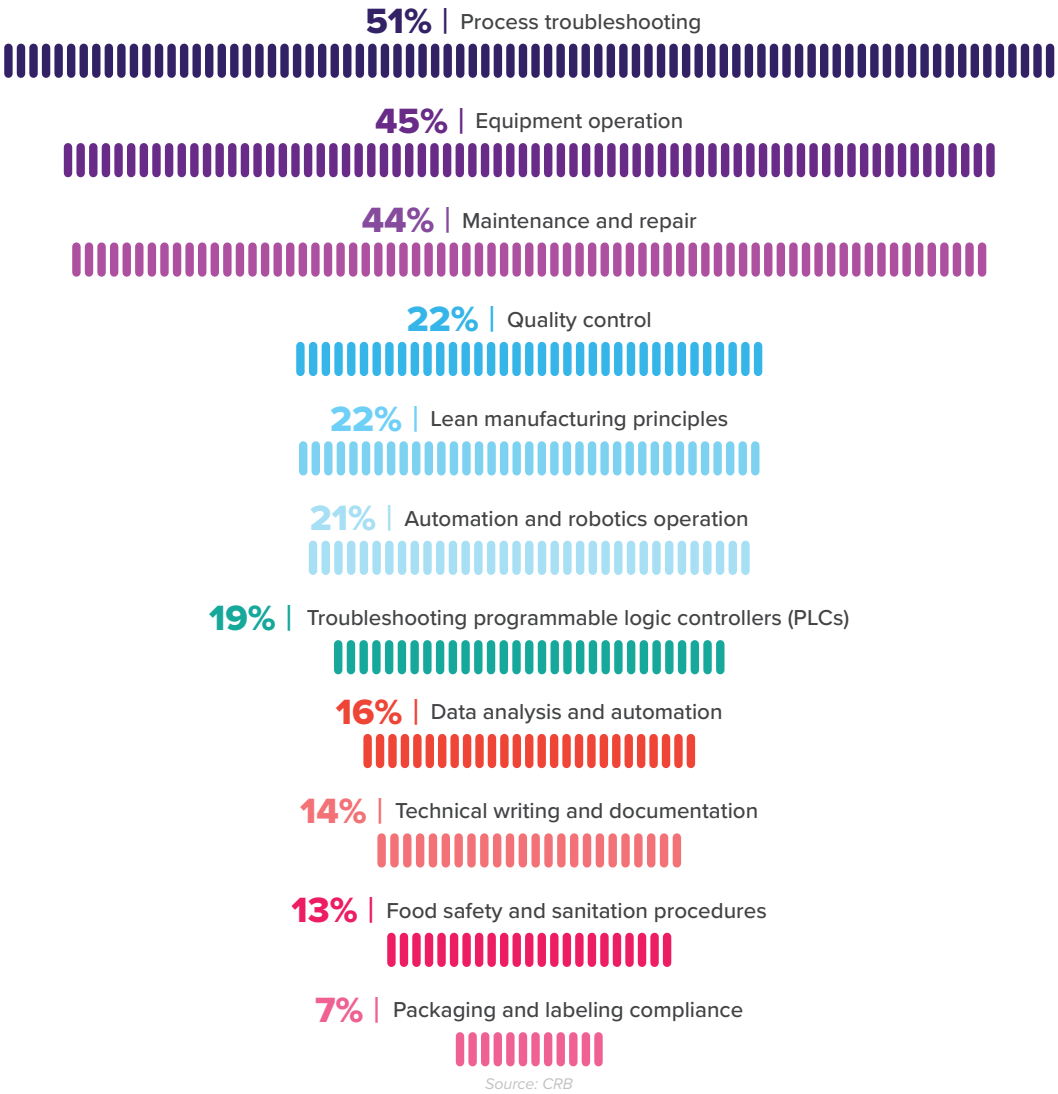


Figure 2.9 | Production Line Skill Gap

"What skills gaps do you encounter most when hiring for a new production line?"



Source: CRB

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