NEW HORIZONS
FOUNDATION
A Chance to Grow

Providing Vision and Leadership for the Future of the HVAC and Sheet Metal Industry

MANAGING SUPPLY CHAIN DISRUPTION

2023

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2023 NEW HORIZONS FOUNDATION MANAGING SUPPLY CHAIN DISRUPTION TASK FORCE

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EXECUTIVE SUMMARY

Between 2020 and 2022, your business likely received phone calls from vendors to notify you that key equipment or material deliveries were delayed – and that instead of being readily available in inventory, it would be *months* before they arrived. Perhaps you even had a vendor that told you they were unable to confirm a fixed price until the unit was loaded onto a truck for delivery. Like the flip of a light switch, material availability and pricing became our industry's largest impediment to getting work done.

These have been crucible years of stress and frustration for your project managers, field leaders, and organization. On some projects, you were able to recover the price increases and manage the delays, and on other projects, you faded margin or pushed beyond the contract schedule. But if you've been even somewhat successful in managing these supply chain challenges, you have been asked to stretch new muscles, solve new intractable problems, put together more creative plans, and collaborate more effectively than ever before.

Best-in-class organizations have learned from these past two years. They've shared what they've learned throughout their organizations. They've made actionable changes to their business – in how they work with their customers and vendors, how they plan, how they execute, and how they adapt to change. And they are prepared to do battle with extended lead times and material uncertainty in 2023, 2024, and beyond.

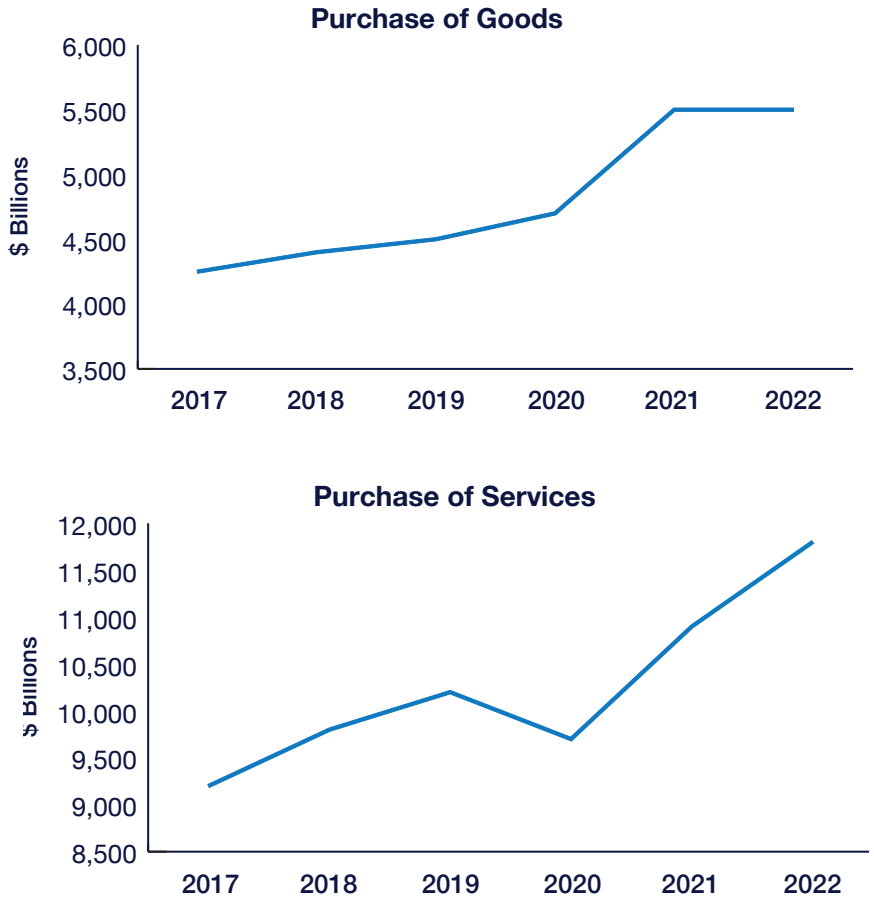
In this paper, FMI and the New Horizons Foundation will share with you what best-in-class SMACNA member contractors have learned– and give you the tools to be more effective in managing supply chain disruption.

1. **Customer Awareness and Education**
   - Driving early alignment by ensuring customers understand the changing costs and risks of their projects
2. **Contract Risk Tools**
   - Example valid pricing windows, force majeure modifications, allowances and shared savings clauses that you can use on your projects
3. **Pre-Job Planning and Prefab**
   - Tools for assessing risk, clarifying roles and accountability, and planning procurement – and why Prefab is helping contractors get ahead
4. **Executing Well**
   - Ensuring that the Field has what they need, when they need it through weekly planning and inventory management
5. **Implementing Best Practices**
   - Tools for assessing your own organization's lessons learned and the root causes of margin gain/fade on your projects to help you become a learning organization

INTRODUCTION

At the end of 2020, something fundamentally changed within our global economy and within construction. Likely as a result of the pandemic, being cooped up at home, a growth in our savings accounts, anxiety about what was going to happen next, or whatever it was – human beings across the world started buying more durable goods than ever before. Demand for all types of goods, including construction products, jumped 40%.

Graph 1: U.S. Bureau of Economic Analysis – Personal Consumption Expenditures: Durable Goods & Services



To meet this increase in demand, the world suddenly needed 40% more manufacturing capacity, 40% more containers, 40% more ships, 40% more trains, trucks, port workers, truckers, etc. – during a global labor crisis.

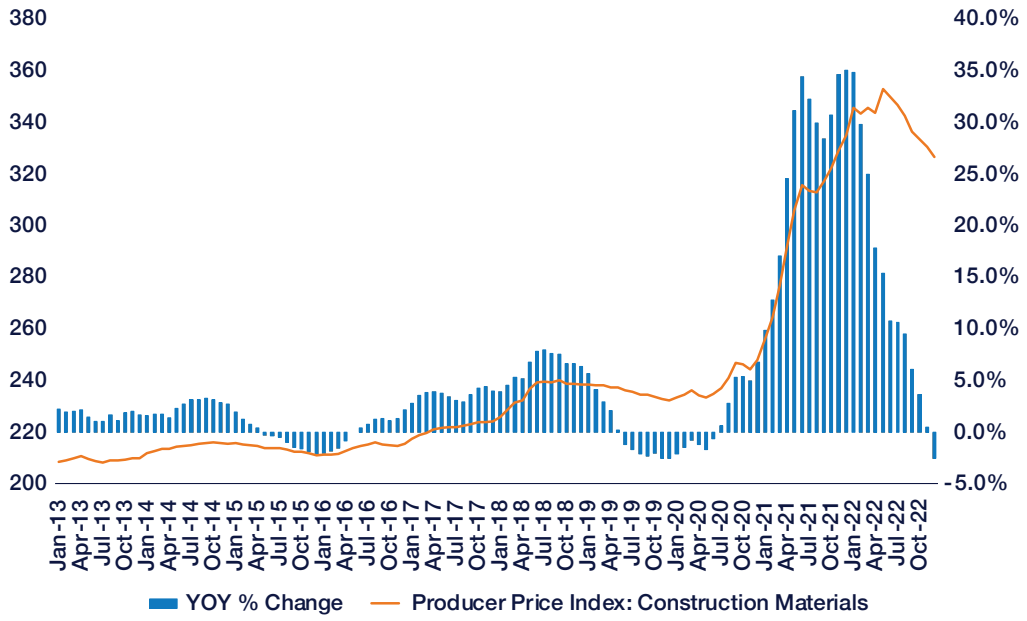
This set off a chain reaction of increasing prices and exorbitant, unprecedented lead times.

Prices of construction materials rose dramatically and with great volatility from July 2020 through the end of 2022. Overall, the price of construction materials rose by nearly than 35%, and HVAC and commercial refrigeration prices increased, on average, by almost 25%.

In early 2023, most construction material have stabilized. Some, like lumber, have even decreased due to the slowdown in single-family home construction. Contractors should note that we are expected to see a return to typical annual price increases of 3% to 4% in 2023 and 2024. But this is by no means guaranteed.

"You'd have to be quite a gambler to know what prices for HVAC equipment will look like in 2024."
– Talbot Gee, CEO of HARDI

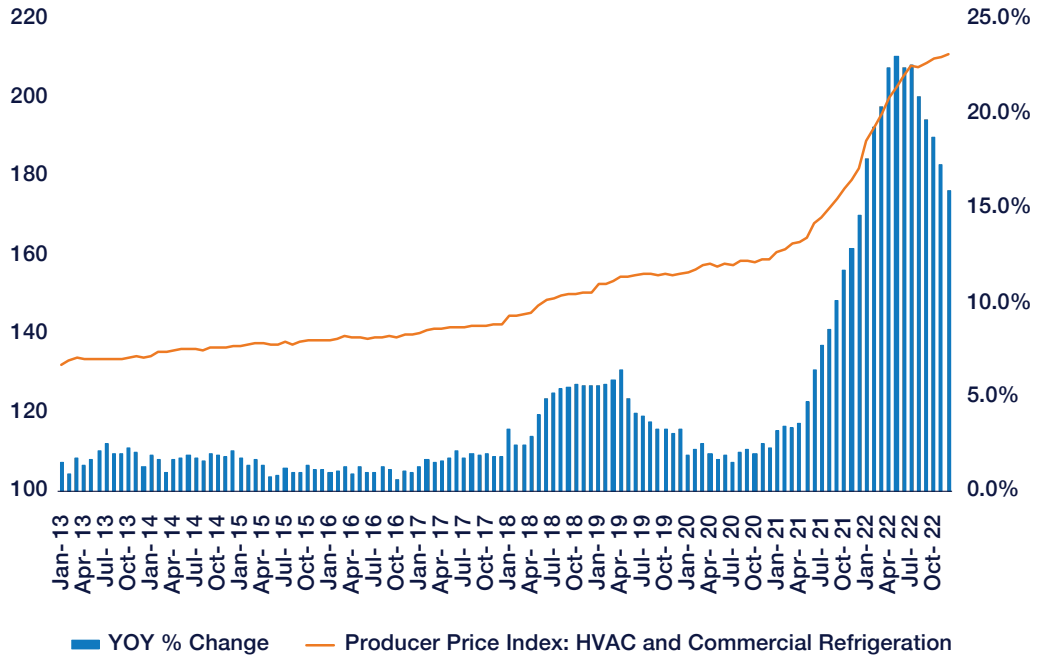
Graph 2: Producer Price Index: Construction Materials (2013 – 2023); U.S. Bureau of Labor Statistics



According to CBRE as of May 2022, lead times for HVAC equipment were up an average of 250% over the previous 2 years, up from around 20 weeks to 36-50 weeks. Other construction materials have experienced similar supply chain disruption. These increased lead times and uncertainty of availability are expected to continue through at least the next 2 years as the global supply chain catches up.

"Two to three years is probably right – for us to get back to normal supply chain and deliveries."
– Tom Schliefer, Ph.D., Simplar Institute

Graph 3: Producer Price Index: HVAC and Commercial Refrigeration Equipment (2013 – 2023); U.S. Bureau of Labor Statistics



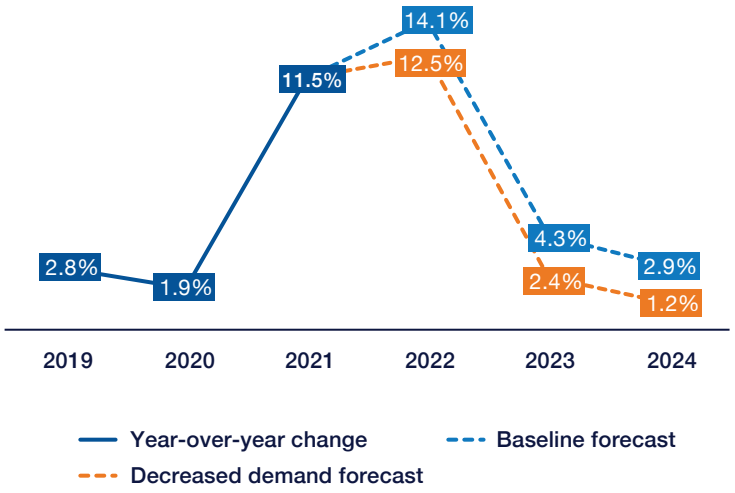
Over the last two years, SMACNA contractor members and FMI clients have shared stories of surprise, anger, and frustration with material and equipment availability. Every week they'd find new parts, materials or construction commodities that were previously off-the-shelf items or available within 1-2 days now had lead times measured in months! And those items that required engineering or manufacturing overseas were often met by a shrug or a "best guess" by distributors and suppliers. In many cases, they didn't know and couldn't get you the answer.

FMI heard a story that in 2021, there was a commercial HVAC manufacturer who was out of supply on a single but specific screw that was required for the assembly of a commercial HVAC unit. Millions of these screws were sitting on a container ship sitting on the ocean, waiting to get unloaded through a port.

In order to restart production at the factory, the engineers had to redesign the entire unit for a different screw that was more readily available. It took more than 2 months.

> "That's been the hardest thing for us. When we don't have equipment in-stock, quoting lead times is a challenge... We often don't have reliable information [from the OEMs or factories], so we want to deliver the bad news up front."
> – Mike Machemehl, Mitsubishi Electric Trane

Graph 4: CBRE Econometric Advisors, CBRE Strategic Investment Consulting, April 2022



And with contractors doing their best to manage these challenges on their projects, many of these horror stories have resulted in project delays, upset owners, and margin fades.

"Depending on what it is, units could be 2 weeks or 20+ weeks to delivery. And even then, sometimes when our project managers are told 30 weeks – they'll hear in week 25 that's it's going to be another 20 weeks."
– Alison Stoker, VP of Supply Chain, Brandt

Graph 4: CBRE Econometric Advisors, CBRE Strategic Investment Consulting, April 2022

Material	Current Lead Time	Two-Year Change
Paint	2-3 weeks	+200%
Steel beams & decking	10-14 weeks	+75%
Drywall & metal studs	**14-16 weeks**	**+600%**
Lighting & controls	14-20 weeks	+100%
Wood doors & frames	18-20 weeks	+233%
Open web joists	18-30 weeks	+125%
Aluminum storefront glazing	16-32 weeks	+300%
Appliances	20-30 weeks	+400%
Electrical panels	30-40 weeks	+433%
Roofing membranes	**35-45 weeks**	**+800%**
HVAC equipment	36-50 weeks	+250%
Roofing insulation	**40-50 weeks**	**+667%**

As SMACNA contractor members look to the future, it is imperative that they incorporate into their businesses the lessons the industry has learned over the past two years. While global supply chain disruption is not in our influence and control – we can still deliver successful projects and manage it well!

> "The consensus out there should be that these challenges have made us better at what we do. They've forced us to shore up our processes and become more diligent."
> – Nick Seraphinoff, Vice President of Project Management, Dee Cramer

In this white paper, FMI will provide tools for best-in-class SMACNA member contractors to improve their businesses and to better manage the risks posed by volatile pricing and uncertain or extended lead times.

What's Old Is New Again – But Different

It's a common trope from FMI that contractors do 3 things: Win Work, Do Work, and Keep Score. You've also probably heard us talk about the importance of planning in driving crew productivity – that the thing that really drives Field productivity and successful projects is making sure they have *what they need, when they need it*.

These fundamental truths about our business haven't changed. But we're in a new risk environment, full of potential potholes and pitfalls.

Best-in-class SMACNA contractors are returning to their fundamentals but looking at old tools and best practices in a new light. A few of these tools deserve a second look and are ones that can help your company to better manage supply chain risks.

Figure 2: Best Practices for Risk Mitigation and Procurement Planning

Customer Awareness & Education

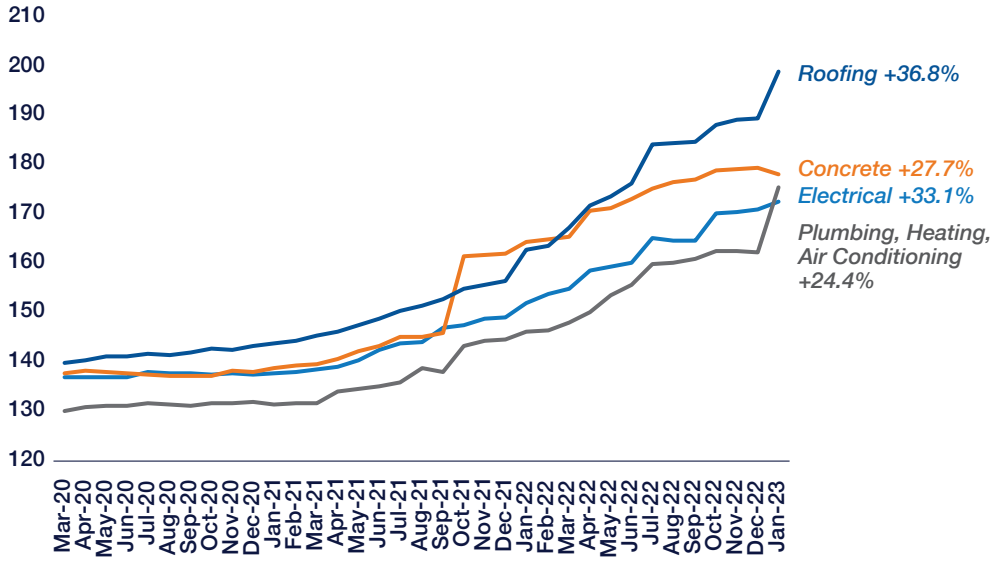
Anyone watching the news in the last year has seen economic figures on 6%, 8% or 10% year-over-year inflation. However, even our best repeat customers likely don't know exactly what this means for a construction project or for their contractor partners.

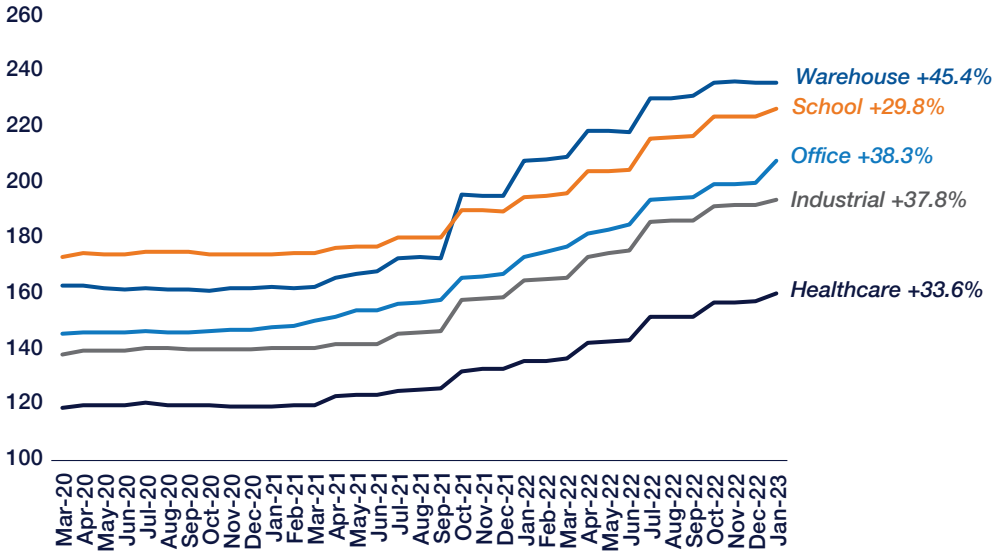
The numbers for construction are striking. According to the Producer Price Index for construction, since March 2020, the input cost of running a plumbing, heating, and air conditioning business has increased by 24.4%.

The cost of your customer's projects has risen dramatically, too. The cost to build a new school is up nearly 30%, and the cost to build a new warehouse is up more than 45%!

For us to be successful contractors, winning the right work, and executing it well, we first need our customers and general contractor partners to understand the risks and costs of their projects. The risk has changed. The cost has increased. We need partners with a shared understanding of the new construction environment.

Graphs 2 & 4: Producer Price Index by Trade Contractor, Project Type; U.S. Bureau of Labor Statistics





Customer Awareness & Education

What:

- Create an annual marketing plan that includes goals for customer touches
- Inform customers of typical lead times and price increases
- Discuss ways in which your company has been successful solving for these
- Ask questions to uncover your customer's business case for the project

When:

- Continuously, quarterly

Why:

- Develop true partnerships with shared understanding
- Create value for your customers
- Drive early alignment on ownership of increased schedule & budget risk

CONTRACT RISK TOOLS

Contracts can and should be a tool that helps all parties understand and equitably split the risk of a construction project.

Furthermore, a project cannot be built without a team of partners. This is a team that needs to be built before the work starts – and often finds its initial shape during contract negotiations.

Best-in-class contractors have been successful in leveraging their owner contracts and the period of contract negotiation to help them better manage supply chain risk.

Contract Risk & Tools: Playing Offense Instead of Defense

Contract Language & Clauses
Force Majeure
Shared Savings

Letters of Intent and Early Purchase of Materials
Early Purchase Agreements for Critical Long Leads

Customer Accountability to Key Project Dates
Submittal Dates on the Critical Path
Owner Design Decisions on the Critical Path

Working with Distributors & Suppliers
Bringing Distributors and Vendors into the Conversation Early
Communication Plan for Lead Time Updates

Valid Pricing Window

Due to pricing volatility between the time a bid is submitted, and the contract is signed, SMACNA contractor Dee Cramer has reduced the window in which pricing is valid from 90 days down to just 14 days – with an option to reprice materials after this period has expired. T.H. Martin holds pricing for only 30 days (instead of 45) and is no longer accepting any contracts that have liquidated damages provisions. Many other trade contractors have modified their change order proposals to explicitly state a valid pricing window of 10 days or fewer.

Force Majeure, Allowances, Shared Savings

Other contractors have successfully negotiated changes to force majeure clauses in contracts, added a contract rider to acknowledge and shed the risk of significant price increases or material delays, or established allowances or shared savings clauses for the riskiest construction materials.

Example Updated Force Majeure Clause

"In the event that a party is unable to perform its obligations under this agreement due to an event outside its control, including but not limited to supply chain disruptions, pandemics, natural disasters, or government actions…"

Example Contract Rider (or Provision) for Time- and Price-Impacted Materials

"If, during the performance of the Contract, the price of materials significantly increases through no fault of the Contractor, the Contract Sum shall be equitably adjusted by an amount reasonably necessary to cover the increased cost. As used herein, a "significant price increase" shall mean any increase in price greater than 10% from the execution date of the Contract…"

"If the Contractor is delayed at any time in the commencement or progress of the Work due to a delay in the delivery of, or unavailability of, a Potentially Time- and Price-Impacted Material, beyond the control of and without the fault of the Contractor, its Subcontractors and Material Suppliers, the Contractor shall be entitled to an equitable extension of the Contract Time…"

Example Allowances and Shared Savings Clauses

"Due to volatility in the HVAC equipment market, the Parties agree that the price of HVAC equipment shall be treated as an allowance and adjusted, up or down, based on the actual price purchased for the project.

The Contract Sum was based on an HVAC equipment price of $200,000. If the price exceeds $210,000 at the time equipment is purchased, then the Contract price shall be increased to reflect the price increase. If the price drops below $190,000 at the time equipment is purchased, then the Contract price shall be decreased to reflect the price decrease…"

Early Purchase Orders for Material

With lead times of 20, 40, or 60 weeks on key critical path materials like VRF rooftop units, best-in-class contractors know that they cannot afford to wait until the issuance of construction documents in order to meet the overall project schedule.

FMI has seen more and more customers be willing to sign letters of intent (LOI) or early purchase order agreements or for long-lead materials. This is quickly becoming an industry best practice.

"When we're quoting these jobs, and we're talking about rooftop units with a 40-week lead time, we raise the flag and tell the customer we better get these on order right away."
– Nick Seraphinoff, Vice President of Project Management, Dee Cramer

"In the last 18 months, we've done 20 procurement-only projects with an LOI – early in the project, even if we're not doing the mechanical install."
– Ben Cooley, Estimator, T.H. Martin

The strategy of using and LOI or early purchase agreements requires you to work with your customer to make critical decisions about their project much earlier in the design. Your customer must understand and be willing to make the trade-off between having flexibility (not being able to substantially change the design at a later date) and reducing the risk to the overall project schedule.

Design & Submittal Milestone Dates

Contract negotiations can and should be used to drive a shared understanding of the customer's role and accountability for helping the project schedule. With extended lead times for material, it is now much more likely that key customer decisions are on your critical path.

Dates for the *customer/engineer approval* of key equipment or material submittals should be noted on the milestone contract schedule.

Early Engagement with Distributors & Vendors

This also means that we cannot wait until after a contract or early purchase agreement is signed to begin working with our key distributors and vendors. If submittal dates and design decisions are on the critical path, our key distributors and vendors need to be a part of the team and an active participant in our customer conversations as early as possible – and set expectations for how and when the team will communicate regarding any future changes in expected lead times.

What your distributors are saying:

"The sooner you start working with us, the better. We prefer design-build."

"There is no upside to being overly secretive with your distributor about your construction plans and schedule."

"Be open-minded and flexible when it comes to the actual solution. That is what will make you successful in spec'ing and delivering solutions for your customers."

"Pay your bills. Right now, distributors aren't willing to commit to you if you're a credit risk."

PRE-JOB PLANNING AND PREFABRICATION

Pre-Job Planning is defined as all the activities that take place within your organization between receiving notice of contract award and mobilizing Field crews to the jobsite to begin work. If there was one thing FMI would recommend doing really, really well, it would be Pre-Job Planning.

Most contractors have a defined process of series of activities that they do for Pre-Job Planning. The new risk environment requires contractors to double-down on Pre-Job Planning, start sooner, and increase the level of communication and collaboration of project teams.

Best-in-class contractors are doing this by dusting off "old" planning tools: diving into the project risks, clarifying project roles and responsibilities, and are thinking creatively about procurement.

"This is not that hard, but you've got to get into it and do the pre-planning. We need to dive into the job, get into the drawings, and go deep in understanding the project – as early as you possibly can."
– Kevin Richison, Director of Fabrication, Brandt

Risk Register

Most project teams in the last 2 years would have put "Critical Long Lead Equipment" or "Material Procurement and Delivery" as one of the riskiest aspects of managing their projects. But that doesn't necessarily mean that the team had a comprehensive plan to manage the risk.

A risk register is a tool that asks the project team, before the work starts, to think through all the things that *could* go wrong on their project and to create an action plan to mitigate them.

Risk Register

What:

- Tool used during planning to identify, talk about, and document project risks
- The project team's plan to mitigate known project risks before they occur

When:

- At handoff from Estimating
- Developed by the project team during Pre-Job Planning
- Updated by the project team throughout execution

Why:

- Helps the project team create a plan to mitigate risk early
- Protects the project from known risks of margin fade, delays

Risk Register

Step 1: Risk Identification			Step 2: Risk Assessment			Step 3: Risk Response		Step 4: Monitor & Control	
Risk ID #	Risk Name	Risk Description	Likelihood	Severity	Impact	Action Plan	Responsible	Date Last Updated	Notes/Comments
1	Critical Long Lead Equipment	Distributor has provided a wide range of possible delivery dates for critical path equipment. Lots of uncertainty.	Medium	High	Would result in a critical path delay, extended general conditions, and possible liquidated damages	Create a joint communication plan between our company, the owner, and the vendor that includes bi-weekly updates Evaluate alternate sources of equipment that are produced domestically Evaluate opportunities to expedite shipping or air freight and associated cost	Project Manager	02/01/23	
2	Site Logistics & Material Management	Hospital requires specific material laydown areas on 3rd floor away from the work area. Material deliveries must be scheduled at least 48 hours in advance.	High	Low	Can be managed through staffing, coordination, and planning.	Foreman and apprentice to stage material after each shift; build this into the project budget Notify key suppliers and warehouse of notification requirements Conduct weekly 3WLAs, especially for tools and materials	Superintendent	04/15/23	
3	Team Experience with Customer	Customer has unique communication and build quality expectations that must be managed well. Project Manager has not worked with this customer before.	Medium	Medium	Could result in customer disatisfaction, rework due to quality,and extended punchlist/closeout	Conduct initial project kickoff meeting with owner prior to mobilization Hold standing weekly check-ins with customer Superintendent and other PM to hold Lessons Learned knowledge transfer meeting with PM during Pre-Job Planning	Operations Manager	03/01/23	
4									
5									

Likelihood *– How likely is it that this will happen on my project?*
Severity *– If it did occur, would the cost or schedule impact be low, medium, or high?*
Impact *– What would be the expected outcome if it did happen?*
Action Plan *– What is the project team going to do to reduce the likelihood, severity, or impact of the risk?*

Downloadable available at: https://www.newhorizonsfoundation.org/wp-content/uploads/2023/06/NHF-Supply-Chain-Risk-Register.xlsx

The project team returns to the risk register throughout the life of the project, makes updates when things change, and holds each other accountable to the items on their action plan.

RACI Matrix

If it is more critical than ever that our project teams communicate and collaborate effectively to manage material risk, it may be a worthwhile Pre-Job Planning exercise for a project team (or your company) to create a RACI matrix.

RACI stands for Responsible, Accountable, Consulted, Informed. This tool asks the project team to discuss and clarify *who* on the project will be accountable for various actions, *who* will be responsible for carrying them out, *who* will be consulted in decision-making, and who will the team inform of the their decisions after they are made.

RACI Matrix

What:

- Tool used during planning to identify project team member roles and responsibilities
- Shows clearly who is accountable for key tasks, who will perform them, and who will be consulted

When:

- Confirmed by the project team during Pre-Job Planning
- Typically based on an organization guideline

Why:

- Helps drive team accountability
- Creates clear expectations for communication and collaboration of the team
- Ensures no one team member "drops the ball"

Based on the last 2 years, it is critical that our project teams are aligned regarding all the aspects of material procurement:

- Who is accountable for procurement on this project? Is it the Project Manager? The Estimator? Purchasing? The Superintendent? The Foreman?
- Is accountability and responsibility different depending on what the material is? Long leads or major packages versus weekly vendor orders to the jobsite?
- Who will be communicating with key vendors? When? How do we make sure this happens periodically so the project team is informed of lead time updates or changes to the delivery plan?
- Who will be coordinating with the Prefab shop regarding the materials they will be ordering for the project?
- Who is responsible for planning deliveries? Laydown or storage, if needed or if delivered early?
- Who is will be receiving material to the warehouse or jobsite? Who will be notified?

Going through a RACI Matrix exercise during Pre-Job Planning requires the team to think through and discuss these fundamental questions, helps the project team manage the challenges that arise, and sets clear expectations among the team.

RACI Matrix

[Project Title]

Roles and Responsibilities

Responsible, Accountable, Consulted, Informed

	Deliverable or Task	Status	CEO/President	Operations Manager	Estimating Manager	Project Manager	Superintendent	Foreman	Estimating	BIM	Purchasing	Shop/ Warehouse
	ROLES		Company Leadership			Project Team			Other Resources			
	Prefab & BIM/Layout											
	Prefab Strategy for Project			I		A	R	C			I	C
	Plan for Layout/BIM			I		C	A	R		C	I	I
	BIM Field Coordination					C	A	R		C		
	Procurement											
	Written Procurement Plan			I		A	C	C	C		C	I
	Communication with Key Vendors			I	I	A			C			
	Long-Lead Item Planning			I	C	A	C	C	C		C	I
	Plan for Receiving & Storing Material			I		A	R				C	C
	Pre-Job Planning											
	Estimating Handoff			C	A	C	C	C	R	I	I	I
	Site Logistics Plan					A	R	C				
	Labor Budget					C	A	R				
	Material Budget					A	C	I	C		C	C
	Project Schedule					A	R	C		I	I	I
	Safety, Quality, & Environmental Plans					A	C	C			I	C
	Permits & Inspections					A	C	I				
	Kickoff Meeting to Confirm the Plan			I		A	C	C		C	C	C
	Project Readiness Stand and Deliver		I	A		R	C	I				
	Project Execution											
	Weekly Material Meeting					A	C	C			C	C
	Site Coordination Meetings					A	R	C				
	3WLAs					C	A	R				
	Schedule Updates		I			A	R	C		I	C	C
	Monthly Status Reports		I	A		R	C	C				
	Project Closeout											
	Kick Finish Meeting			I		A	C	C		I		
	Pre-Turnover Inspections					A	R	C				
	Turnover		I	I		A	R	C				

LEGEND		Descriptions
R	Responsible	Charged with carrying out the task, ensuring its timely and accurate completion
A	Accountable	Possesses ultimate decision-making authority and sole responsibility for the successful completion of the task. Limited to one individual per task to ensure clear ownership.
C	Consulted	An experienced advisor, stakeholder, or specialist in the relevant domain who provides valuable input, insights, and recommendations to inform the decision-making process or course of action
I	Informed	A key party that must be kept up-to-date and informed of decisions or actions taken, ensuring alignment and awareness across the project or organization

Downloadable available at: https://www.newhorizonsfoundation.org/wp-content/uploads/2023/06/NHF-Supply-Chain-RACI-Matrix.xlsx

Procurement Log

Most contractors are using a written Procurement Log or Buyout Log tool during the early stages of a project. Given our new material risk environment and your company's experiences over the last 2 years, this tool likely deserves some improvements.

Best-in-class contractors are using their Procurement Log as *more* than just a tool to track or witness what's been ordered and when it will be delivered. They are using their Procurement Log to understand and manage the risk of material delays – and to create a Plan B.

Suggested additions to your company's Procurement Log or Buyout Log:

- Where is the material being manufactured or fabricated? (Point of Origin)
  - We know that material coming from overseas, on a ship, through a port, and through customs is inherently riskier – so let's acknowledge it
- How much has the quoted delivery date shifted since our initial quote?
  - If we find ourselves revising the delivery date frequently – or experiencing multiple delays, let's investigate an alternate plan
- Is this material on the critical path?
  - If we were notified of a significant delivery delay on this item, does it (or would it) impact the critical path of the project?
  - Chances are good that if it impacts the critical path, our schedule gets extended, our general conditions get extended, and we may fade margin
- Who are the alternate vendors that might be able to supply this material? What was the price difference?
  - Is this a specialty item or specialty fastener from a single supplier, or can it be substituted with another solution?
  - It's entirely possible that a single day of delayed material deliver results in multiple times the price difference between two vendors
- Can we expedite this material? How? What would it cost?
  - It may absolutely may be worth it to your customer to pay air freight from overseas to avoid a schedule delay

Procurement Log

What:

- Plan for procuring and tracking long-lead materials, other project materials, and subcontracts

When:

- Developed by the project team during Preconstruction or immediately following project award
- Updated by the project team throughout execution (weekly, bi-weekly, or monthly)

Why:

- Helps the project team create a plan to mitigate risk early
- Protects the project team from known risks of margin fade, delays
- Requires the project team to track delays and consider alternate vendors, sourcing, expediting

Procurement Log

			STATUS					TARGET DATES			MATERIAL & DELAY TRACKING					ALTERNATE SOURCE & EXPEDITING			
	List of MATERIAL, EQUIPMENT and SUBCONTRACTS	Long Lead >3 weeks (Yes/No)	Vendor	PO Number	Date PO Issued	Date Submittal Approved	Date Received	Need By Date	Target Date for Executed PO	Target Date for Submittal Approval	Material Origin or Fabrication Location	Original Quoted Delivery Date	Revised Target Delivery Date	Delay (in Days)	Impact to the Critical Path (Yes/No)	Alternate Vendor(s)	Price Difference for Alt. Vendor	Cost to Accelerate Shipping if Delayed	Notes
1	Heat Exchanger Unit	Yes	Med Gas, Inc.	123456	1-Jan-23	15-Jan-23		1-Apr-23	1-Jan-23	15-Jan-23	Ireland	15-Mar-23	1-May-23	30	Yes	Patriot Supply	$ 5,600	$ 2,100	Patriot Supply needs PO by 2/1/23 to make promise date of 4/1/23
2	Rooftop VRFs	Yes	Trane	123789	1-Sep-22	1-Oct-22		28-Feb-23	15-Aug-22	1-Sep-22	China	15-Jan-23	1-Apr-23	76	Yes	Daikin	$ 45,000	-	Owner not willing to accept cost difference; CR denied
3	VRF Fabricated Duct Transitions	No	ABC Fabrication	555123	10-Jan-23	5-Feb-23	5-Mar-23	10-Mar-23	15-Jan-23	22-Jan-23	Texas	10-Mar-23	-	-	-	-	-	-	
4	Gas Regulator	No	Emerton	555789	1-Nov-22	-	3-Feb-23	10-Feb-23	1-Nov-23	-	Various	3-Feb-23	-	-	-	-	-	-	
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Downloadable available at: https://www.newhorizonsfoundation.org/wp-content/uploads/2023/06/NHF-Supply-Chain-Procurement-Log.xlsx

Prefabrication

SMACNA member contractors that are utilizing Prefab are finding that they are more successful in this new environment of higher risk. Whether you are fabricating duct sections, de-boxing, kitting to Gaylord boxes, or creating mechanical skids or assemblies, growing your Prefab muscles will teach you how to better manage supply chain disruption across your projects.

Prefab is not construction. Your prefab shop is a low-volume manufacturer of construction products. Just like a manufacturer, they must do rigorous upfront procurement planning as early as possible. They need all the parts and pieces on-hand before they can build the assembly and ship it to the jobsite. Prefab usually can't afford a last-minute hiccup or surprise. Their coworkers on the jobsite are relying on them. Just like you demand from your 3rd party distributors, Prefab makes a commitment to your project teams that they will deliver quality assemblies to the jobsite, on time, every time.

A successful Prefab shop becomes really good at planning and managing procurement. They ask the right questions, get the right answers, have strong vendor relationships, and know their lead times.

Prefab also requires your project teams to lean in and collaborate regarding what items will be made in the shop versus purchased from a 3rd party. Within days of project award, your project team is forced to put an early focus on material and procurement planning.

Organizations that have learned how to do Prefab have greater visibility to supply chain challenges and are solving them sooner.

> "Prefab has caused us to understand and be able to see lead time issues earlier. It has put us ahead of the game."
> – Alison Stoker, Vice President of Supply Chain, Brandt

EXECUTING WELL

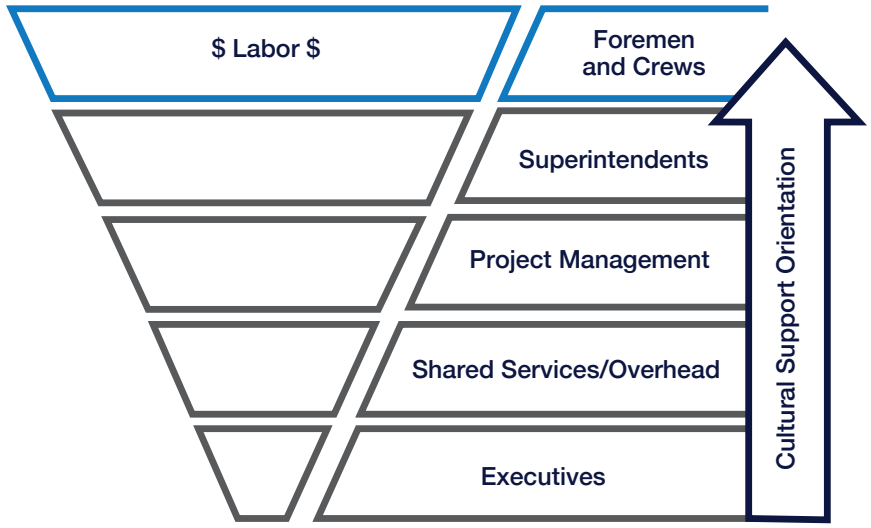
The organizational chart of a typical construction company looks like a triangle, with the CEO and executive perched up at the very top. Everyone working on the lower rungs of the organization is spending lots of time and energy to feed information upward – to ensure that leadership has what they need, when they need it, to make great decisions to run the company.

However, best-in-class construction companies operate as if they had an *upside-down* organizational chart. In construction, there is one thing we get paid to do: *install work correctly the first time*. The people that are responsible for doing the thing that gets us paid are the Field foremen and their crews.

In a Field-focused construction company, the Foremen and the crews are at the top of the organizational chart. Every in the company knows that their highest-and-best use is to ensure that the Field has *what they need, when they need it*, to install work correctly the first time.

The largest differentiator between a best-in-class versus an average sheet metal and HVAC contractor is not the material they buy or how they buy it. It's in how they drive crew productivity and support labor in the Field. The Field has what they need to be successful.

In our current environment of uncertain lead times and heightened material risk, this challenge has never been greater.



Look-Ahead Planning

Before work starts in the Field, the project team should have a good plan for procuring long lead items and key mechanical packages for the project. But construction isn't manufacturing. We are building bespoke projects, in a unique location, for a unique customer. It is unreasonable to expect that there won't be challenges or changes after the work begins.

Look-Ahead Planning (or Short-Interval Planning) is the best tool for ensuring that the organization is providing the Field with *what they need*, *when they need it*, during the execution of a construction project.

A look-ahead plan is the Foreman's weekly shopping list, for the next 3 weeks, of what they will be doing on the project and what they will need in order to be productive. It should include:

- **Tasks** – for this week and the following two weeks
- **Manpower** – how many, what trades, working on what activities
- **Information** – RFIs, submittals, answers that are needed in order to do the planned work

- **Tools & Equipment** – What tools are needed to do the planned work? Are they on-site?
- **Alternate Work** – What is my plan "B" for keeping the crew productive if I wasn't able to do the work as planned (access, weather, trade-stacking)?

And finally:

- **Materials** – What am I missing? What needs to be procured and delivered? Where is it?

Look-Ahead Planning

What:

- A foreman's weekly shopping list for the organization and the project team
- Includes manpower, tools, equipment, material, information needed for 3 weeks
- Gets sent to the Superintendent and Project Manager

When:

- Foremen prepares and sends the day before your company's weekly Operations or manpower meeting
- Superintendent and Project Manager follow-up by Friday confirming the plan and resources

Why:

- Helps prevent emergency calls from the Field, especially regarding tools, equipment, materials
- Ensures project team and the organization are focused on supporting the Field
- Drives productivity in the Field

Look-ahead planning is the tool that helps your Field and project teams catch material issues at least 3 weeks in advance, and gives the organization an opportunity to respond sooner.

Best-in-class contractors are doubling-down on look-ahead planning, ensuring their Field leaders are consistently doing 3-week planning, and that Project Managers and Superintendents are reviewing and responding weekly to the Field's shopping list.

Three-Week Look-Ahead Plan – The Foreman's "Shopping List"

Objective= Fill out by Wednesday noon and review with work crew. Fax to office by the end of the workday on Wednesday of each week.

Project Manager _____ Week Ending _____

PROJECT _____ FOREMAN	Manpower *(Indicate how many people you will need on each day)*							What materials & equipment are needed to complete planned work for next week?	Are materials on site?		Is this a "Repeat Request"?	
What work is planned and scheduled to be completed next week?	Mon	Tues	Wed	Thurs	Fri	Sat	Sun		Yes	No	Yes	No
What alternate work is planned if scheduled work happens to fall through? (i.e., PLAN B WORK)												
Total manpower needed to complete next weeks work.												

Did you receive a follow-up phone call from your project manager discussing last week's 1 week look-ahead? ☐ YES ☐ NO

Did you discuss this with your crew before sending it in? ☐ YES ☐ NO

What subcontractors do you need next week?

What issues need resolutions or answers? From whom do you need answers? When is it needed?

What plans should we be making beyond the next week? Who should be planning? When will it be critical?

Do you have any foremen working on your project next week? If so, please list them below and the expected durations.

Inventory

Another way that contractors have tried to ensure that the Field has *what they need*, *when they need it*, is by stocking a limited inventory of common materials.

Having some safety stock is good, if it minimizes headaches for the field. It is generally far cheaper to have an inexpensive and common material in stock than to risk running out and damaging crew productivity.

However, inventory can cause larger organizational challenges, and contractors should be wary of holding excess inventory either in their shops or on their jobs.

When we have too much of it, can actually hurt crew productivity.

One FMI client remarked that their foreman spent at least 4 hours a week going on "jobsite safari" – looking for materials that were likely already delivered to the jobsite but were lost, difficult to find, or forgotten.

And many contractors do not understand or appreciate the risks and the costs of excess inventory – whether on the jobsite or in the shop. Inventory is expensive and creates organizational challenges.

Best-in-class contractors have learned that, even with the challenges to material availability and lead times, they should store materials only when it's absolutely necessary, to dedicate resources to track and manage it – and get paid for it.

Inventory and Storage

Be careful not to grow in-house inventories or on-the-job storage

- Some safety stock is good if it minimizes headaches for the Field
- Excess on-the-job storage results in "jobsite safari" and decreased field productivity

As much as possible, contractors should get paid to hold or store material

- Excess inventories are risky and costly, and most contractors don't understand the full carrying costs
- Capital costs
- Storage costs (lease/rent, utilities, warehouse labor & equipment)
- Service costs (Builder's Risk, General Liability, Taxes, software)
- Breakage, spoilage, theft, shrinkage, miscounts, fraud, obsolescence
- Bonding or surety considerations (increased long-term assets)

Quotes from SMACNA Member Contractors

"*We've made an investment in inventory tracking systems – and our overhead has had to increase."*

"We have assigned 2 shop managers to log what's coming in, deliver packing slips to PMs, so we always know what's here."

"We've tried to keep our inventory down. We don't want to have to manage it or pay the extra tax."

IMPLEMENTING BEST PRACTICES

How do we become a learning organization that learns from our challenges, revisits our processes, and grows into this new risk environment? How do we find our organization's one best way to tackle these new challenges?

Change is hard. It takes an enormous amount of time, energy, and effort to make change inside a construction business. It's not simply having a flowchart, meeting agendas, and checklists.

Contractors that are process-driven organizations, with clear expectations, consistency, and accountability have supported their processes with:

1. **Processes** – Flowcharts or a written "how-to" that specifies roles, responsibilities, and action steps
2. **Process Tools** – Meeting agendas, checklists, and reports that support the process and ensure we're having the right conversations at the right time with the right people
3. **Training** – On the process, delivered consistently and periodically over time, including to new employees or team members
4. **Skills & Experience** – Processes, tools, and training only work if the people that are using the process have the required skills & experience to develop solutions
5. **Leadership & Accountability** – It is important within our culture that we follow the process consistently, and that this is measured, monitored, and reinforced through leadership

Post-Job Reviews

Learning organizations are performing frequent post-job reviews on both good and bad projects, and are asking new questions about materials and procurement. They are uncovering new best practices within their organization and knowledge that can be transferred to new projects and new project teams.

- What went well that we should keep doing?
- What did we learn from this project that we should start doing?

- What did we do on this project that we should stop doing?

New Post-Job Review questions regarding materials and procurement:

- Did we have a material-related delay that impacted our field productivity and/or indirect costs (i.e., general conditions)? What could we have done differently?

Post-Job Review

What:

- Process for gathering lessons learned on completed projects
- Sometimes involves customer, vendor, project team surveys
- Gets shared within the organization for future projects

When:

- Meeting held with key project team members typically within 2-4 weeks after substantial completion
- Lessons learned are used by the organization when doing Pre-Job Planning

Why:

- Helps the organization learn its strengths and opportunities for improvement
- Increases likelihood of success in selection and execution of future projects

Completed Contracts Analysis (Gain/Fade)

How much was your business impacted in 2021 and 2022 by supply chain disruption?

Did you fade margin on one job? A few jobs? Why?

Did those jobs have anything in common?

Should we take action as a company to fix it?

Completed Contracts Analysis is a deep-dive into the sources of margin gain and margin fade on your projects.

There are only a few pieces of data necessary to conduct this analysis on your own past projects:

1. **Final Actual Costs** – What did we actually spend in direct costs on the project?
2. **Revised Estimated Costs** – How much did we think we were going to spend on this project, including the estimated costs of our change orders?

We also need to know how much was labor, materials, subcontracts, equipment, or other costs – both from our estimates and from our actuals.

You can also look at the data by company, project size, project type, market segment, customer, or even project team.

Many SMACNA contractors likely faded margin in 2021 and 2022 on both material and labor. Which was bigger for your company? Why?

Having this information displayed graphically can be incredibly helpful for the organization to better understand its strengths and weaknesses – and help us see what to do about it.

Completed Contracts Analysis

What:

- A deep-dive into estimated versus actual direct costs and sources of margin gain/fade
- Looks at all projects completed in the last year (or 3-5 years)

When:

- Annually (or as an input to strategic planning)

Why:

- Ensures the organization understands the primary sources of margin gain/fade
- Helps the organization learn its strengths and opportunities for improvement

"When it doesn't work, find out. Dig in. Go to the source."
– Tom Schliefer, Ph.D., Simplar Institute

SUMMARY

- **Price volatility** – the worst appears to be behind us, but do not expect prices to decline overall
- **Lead times and availability** – unpredictable and extended lead times are expected to continue for at least the next 2-3 years
- **Best in class contractors** have learned how to better manage supply chain risks and have made actionable changes to their businesses
- **Leverage the contract** to drive early conversations with customers about the price and schedule risk on their projects
- **Focus on early identification of risk and put together a plan** – talk about it and document it
- **Planning tools work** – consider the need to update your Pre-Job Planning tools to better manage material procurement
- **Support the Field** and make sure they have what they need, when they need it
- **Become a learning organization**, and don't miss this opportunity to improve your business using what you've learned in the past 2 years

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