8 STEPS TOWARD AN AI-DRIVEN MANUFACTURING ORGANIZATION

February 16, 2023
Welcome

The Key Business Challenges in Manufacturing

Data and AI Solutions in Manufacturing Today

How to Get Started

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Key Business Challenges in Manufacturing
Manufacturing at a Glance

70% say supply chain disruption will pose some risk or a significant risk in 2023.

36% will pursue Industry 4.0 investments.

68% will expand U.S. operations.

38% will pursue M&A in response to higher cost of goods sold (COGS).

The 2023 BDO Manufacturing CFO Outlook Survey polled 125 manufacturing CFOs with revenues ranging from $250 million to over $3 billion in October 2022. The survey was conducted by Rabin Research Company, an independent marketing research firm, using Op4G’s panel of executives.
The New Manufacturing Resilience Agenda

Manufacturers are cautious of headwinds, including rising interest rates, higher costs and economic volatility. Manufacturing CFOs project that a downturn would lead to significant financial issues.

Fortunately, manufacturers have learned from previous downturns and are taking proactive measures to increase resilience.

**TOP PROFITABILITY/LIQUIDITY ISSUES**
Manufacturers are anticipating the following profitability and liquidity issues in the next 12 months:

<table>
<thead>
<tr>
<th>Percent</th>
<th>Issue Description</th>
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<tbody>
<tr>
<td>49%</td>
<td>Increasing payables beyond historic terms in total amount and/or aging in days</td>
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<tr>
<td>42%</td>
<td>Significant decreases in revenue or deteriorating profit margins</td>
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<td>39%</td>
<td>Insufficient cash on hand or the need to delay expenditures</td>
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**2023 RESILIENCE STRATEGIES**

<table>
<thead>
<tr>
<th>Percent</th>
<th>Strategy Description</th>
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<tbody>
<tr>
<td>48%</td>
<td>Taking advantage of clean energy incentives in the Inflation Reduction Act</td>
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<tr>
<td>39%</td>
<td>Cost optimization/reduction</td>
</tr>
<tr>
<td>36%</td>
<td>Digital transformation</td>
</tr>
<tr>
<td>25%</td>
<td>Restructuring or reorganizing</td>
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<tr>
<td>21%</td>
<td>Understanding tax implications of strategic business decisions</td>
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It’s been proven that more digitally mature companies have an edge during a downturn.

Manufacturers who maintain or increase Industry 4.0 investment will be better positioned to adapt to disruption and capture new opportunities.

Implementing automation technology can improve efficiency in operations and increase profitability.

Look to improve data visibility throughout their own supply chain, but also share data with customers and vendors. Build a digital thread, which creates end-to-end supply chain visibility and enables closer collaboration across the supply chain.

Tax planning will be another key component of manufacturers’ resilience strategies for 2023.

The Inflation Reduction Act (IRA) created and expanded tax incentives that manufacturers are pursuing to reduce their total tax liability.

Manufacturers have learned that a crisis is a smart time to pivot, and a quarter of CFOs plan to restructure or reorganize their businesses.

- Changing their business model from B2B to B2C
- Enhancing e-commerce capabilities
- Overhauling their product portfolio
- Tiered customer support model

PIVOT PLANS IN A DOWNTURN

- Increasing layoffs: 33%
- Moving to a tiered customer service model: 33%
- Adjusting pricing model: 30%
- Moving to a variable cost base: 30%
- Rationalizing product portfolio: 30%
- Reducing overall inventory: 30%
- Paying down debt: 20%
Over the last few years, manufacturers have considered making significant changes to their network footprints in response to global disruption. Now, they are prepared to put those plans into action and alter the shape of global supply chains.

**Expected Inventory Issues for 2023**

- Rising raw material and supply costs: 46%
- Extensive excess inventory: 36%
- Unreliable supplier performance: 34%
- Continued supply shortages: 33%
- Inaccurate supply and demand forecasting: 32%
- Demand volatility: 18%

**Planned Responses to Higher COGS**

Here are the actions manufacturers plan to take in the next 12 months in response to higher cost of goods sold (COGS):

- Improve supply chain systems & visibility: 42%
- Raise prices for customers: 31%
- Move production to a geopolitically close U.S. ally: 30%
- Find alternative suppliers: 28%
- Onshore production to the U.S.: 23%
- Absorb the increase: 22%
- SKU rationalization: 21%

**Even an economic downturn will not stop them:**

75% of CFOs say their plans for supply chain will increase or not change if economic conditions worsen.
Supply Chain Visibility

2023 BDO MANUFACTURING CFO OUTLOOK SURVEY

Increasing supply chain visibility will also help manufacturers meet environmental, social and governance (ESG) goals, which will continue to increase in importance due to evolving expectations from customers, investors and governments.

Access to deeper insights about plant and supplier operations will help in particular with supporting reporting for manufacturers’ sustainability strategies.

The Uyghur Forced Labor Prevention Act (UFLPA), which went into effect in June 2022, bans imports of products into the U.S. produced with forced labor from the Xinjiang region of China. Companies must meet a burden of proof that their products were sourced with ethical labor, which requires data from their suppliers.

Looking ahead, there will be additional legislation with requirements around ethical labor and sustainability, which will require collaboration across the supply chain to provide data on production and labor practices.

Where Manufacturers are Moving

- 68% will expand operations in the U.S.
- 36% will expand in North America (non-U.S.)
- 34% will expand in Asia-Pacific (non-China or India)
- 31% will expand in South America
- 26% will expand in China
- 23% will expand in India
Looking Ahead

To succeed in the future, manufacturers must rethink their businesses. Success means going beyond adapting to changing stakeholder expectations, and instead proactively creating products and services to fill their needs. Competition amongst the highest-growth manufacturers will be intense — and organizations who can adapt and capture opportunities fastest will be the most successful.

The role of the CFO is changing dramatically. My top priority is brainstorming solutions to customer needs and thinking through my company’s vision. Manufacturing CFOs need more than financial acumen to succeed - they need a deep understanding of their entire business and must collaborate to innovate.

Chuck Beto
Chief Financial Officer, KSR International Inc.
Data and AI Solutions in Manufacturing Today
What Some People Think When They Hear ‘Data & AI’

THE TERMINATOR
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AVA - EX MACHINA
© Universal City Studios LLC

C3PO - STAR WARS
© The Walt Disney Company

BISHOP - ALIENS
© 20th Century Studios

DATA - STAR TREK
© CBS Studios Inc.
Beyond the Buzzword

**Data Analytics Definition**

The process of examining datasets to draw conclusions about the information they contain.

Data analytic techniques enable you to take raw data and uncover patterns to extract valuable insights from it.

**A.I. Definition**

A.I. is a broad topic with a rich set of sub-disciplines, methods, and tools that bring together areas such as speech recognition, computer vision, machine translation, reasoning, attention and memory, robotics and control.

A.I. mimics "learning" and "problem-solving" through advanced algorithms and machine learning.
Poll Question 1

Where are you in the AI journey?

Responses -
▶ Not started yet
▶ Exploring use cases to see where AI would fit
▶ Have a thought or idea of an AI roadmap
▶ Currently implementing an AI roadmap
## Data & A.I. in Manufacturing

**USE CASES ACROSS THE ENTERPRISE**

<table>
<thead>
<tr>
<th>PROTECTING YOUR WORKFORCE (People)</th>
<th>MANAGING YOUR BUSINESS (Strategy &amp; Operations)</th>
<th>MITIGATING RISK (Risk)</th>
<th>UNDERSTANDING THE ECONOMIC IMPACTS (Financials)</th>
<th>EVOLVING REGULATION, LEGISLATION &amp; COMPLIANCE (Regulation)</th>
</tr>
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<tbody>
<tr>
<td>Persevere</td>
<td>Employee Health &amp; Safety</td>
<td>Crisis Management &amp; Customer Retention</td>
<td>Supply Chain Continuity</td>
<td>Liquidity &amp; Cash Flow</td>
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<tr>
<td>Maintain</td>
<td>Workforce Planning &amp; Productivity</td>
<td>Recesson Proofing</td>
<td>Supply Chain Optimization</td>
<td>Cost Optimization</td>
</tr>
<tr>
<td>Recover</td>
<td>Strategic Hiring</td>
<td>Customer Acquisition</td>
<td>Supply Chain Capacity</td>
<td>Financial Hardening</td>
</tr>
<tr>
<td>Thrive</td>
<td>Talent Acquisition &amp; Retention</td>
<td>Performance Improvement &amp; Innovation</td>
<td>Resiliency Engineering</td>
<td>Growth Financing</td>
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**8 STEPS TOWARD AN AI-DRIVEN MANUFACTURING ORGANIZATION**
Visualizing Data for Insights

- Auto parts company
- Track current and projected cost and sales
- Microsoft Power BI dashboard
Machine Learning AI

- Predictive Forecasting
- Predictive Churn
- Predictive Quality
- Network Optimization and Simulation
- Machine Utilization and Predictive Maintenance
How to Get Started

How to Leverage Data and AI in the Manufacturing Industry

8 Steps Toward an AI-Driven Manufacturing Organization
AI in Manufacturing Forecast

The global AI in manufacturing market is anticipated to attain a CAGR of ~25% over the forecast period, i.e., 2022 – 2030.

Research by Nesters Article Manufacturers and Distributors (M&D) want to capitalize on this growth by leveraging AI however do not know where to start.

In order to capitalize on this opportunity and leverage AI implies investment from the business.
Difference with the AI Supported Decisions vs Forecasting

**Forecast**
- Estimating based on past data and analysis as basis
- Definitive statement
- Scientific and unaffected by personal bias
- Based on patterns that are thrown ahead
- Errors can be identified
- Repeatable
- In business, forecasts the level of demand

**Prediction**
- Predicting based on events that could occur
- Probabilistic Statement
- Inherent bias as it is based on intuition
- Based on random data to say what is ahead
- Nearly impossible to identify errors
- Depends on the data & the representation
- In business, predicts whether a change may or may not create demand
Common Challenges with AI in Manufacturing

**GETTING STARTED QUICKLY**

Your organization wants to use AI and get value out of it, but you don’t know which ‘low hanging fruit’ use cases to start with for your industry.

**LIMITED RESOURCES**

Finding and hiring data scientists is challenging. Joblist.com currently has 1.3M job openings in the U.S.

**BUSINESS IMPACT**

Even if organizations do invest, most fail to get beyond experiments with only 15% creating value for the business.

**TOOLS & TECHNOLOGY**

Most organizations don’t have the tools and technology to maintain their models - only 1% of models are kept up to date once operationalized.
Poll Question 2

What are your concerns of using AI in your organization?

Responses -

- Not sure of business case
- Too much uncertainty about AI
- Not sure where to start
- Not enough resources/budget
- No concerns, I'm all in!
Goals

- Where to start on the AI journey?
- Education and understanding AI and its impact on the business
- Understanding the ROI brought by AI
- You could easily operationalize AI into production, workflows, business strategies and processes
- Evaluate success of AI supported decisions
8 Steps To AI-Driven Manufacturing Organization

1. Educate
2. Data Discovery
3. Data Exploration
4. Data Predictive Value
5. Minimum Viable Product
6. AI Roadmap
7. Deployment
8. AI Supported Decisions

8 STEPS TOWARD AN AI-DRIVEN MANUFACTURING ORGANIZATION
Use Case - Optimize Time to Results

- Controller wastes nine hours every week
- Huge spreadsheet with multiple calculations
- Job run time/labor vs estimate
- Job ingredients used vs expected
- Data reviewed too late to create efficiencies
- Months later that we realized there was a problem
Poll Question 3

Do you have dedicated resources to AI?

Responses -
- We are exploring
- We have a Data Science team
- We are hiring
- We have outsourced AI resources
1. Education

- Where to use AI?
- Why to use AI?
- What AI is and is not?
- How to use AI?
- What do you need to succeed with AI?
2. Data Discovery

Data -

- In silos in different systems and geographies
- Democratizing
- Availability to use
3. Data Exploration

Evaluate the data for:

- Quality
  - Accuracy
  - Consistency
- Preparation
  - Cleansing
  - Normalizing
  - Translation
Data’s predictive value can be categorized as

- Strategic
- Operational
Use Case - Production Schedule Optimization

- Products manufactured but not picked up
- Delay in revenue recognition
- Lot space unavailability
5. Minimum Viable Product (MVP)

Identify use cases that can be used to evaluate whether AI is the correct tool based on

- Data availability
- Sufficient ROI
6. AI Roadmap

A roadmap on developing and integrating AI into the business processes based on -

- Use Cases
- Data Availability
- Deployment
Once AI is productionized

- Integrated with business processes
- Training on usage
- Monitoring for changes in performance
- Additional training for AI
8. AI Supported Decisions

Using AI in supporting decisions. Evaluated for -

- AI prediction based on outcome
- Improvement opportunities
Use Case - Employee Churn Model

- Talent Turnover
  - Significant on-boarding effort, time, & cost to backfill
  - Loss of revenue
- Needed to understand why and when a turnover is possible
BDO Digital AI Approach
GENESIS
Decision Intelligence Framework

Decision Intelligence (DI) is transforming the way modern organizations utilize data insights.

At BDO, we offer a holistic approach, by working on multiple elements of the framework, from analytics, automation, to artificial intelligence, and beyond.
How do we increase accuracy and operationalize the prediction?

How do we support and improve the prediction?

What can the data predict to help solve the business problem?
The AI Platform as a Service - Subscription Based Service

- FAST
  - Rapid Insights and ROI
  - Industry Focused Solutions
  - Quickly Scalable

- CONSISTENT
  - Leading Data Science Practices
  - Integrates with current tools and process

- TRUSTED
  - Open and Explainable
  - Reduced Risk in using AI
  - Increased Business Impact

New Way
BDO Digital
Genesis

8 STEPS TOWARD AN AI-DRIVEN MANUFACTURING ORGANIZATION
Poll Question 4

If you could use AI today, where would you focus?

Responses -
- Predict sales
- Predict employee turnover
- Predict operational issues
- Predict customer churn
- Predict cash flow
Thank You
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