

# PERSPECTIVE

CHANGES EVERYTHING.

Understanding Profitability:  
*Better Visibility into Job Costing*



WIPFLI

Welcome!



**Mark Stevens**

Principal



**Mike Devereux**

Partner



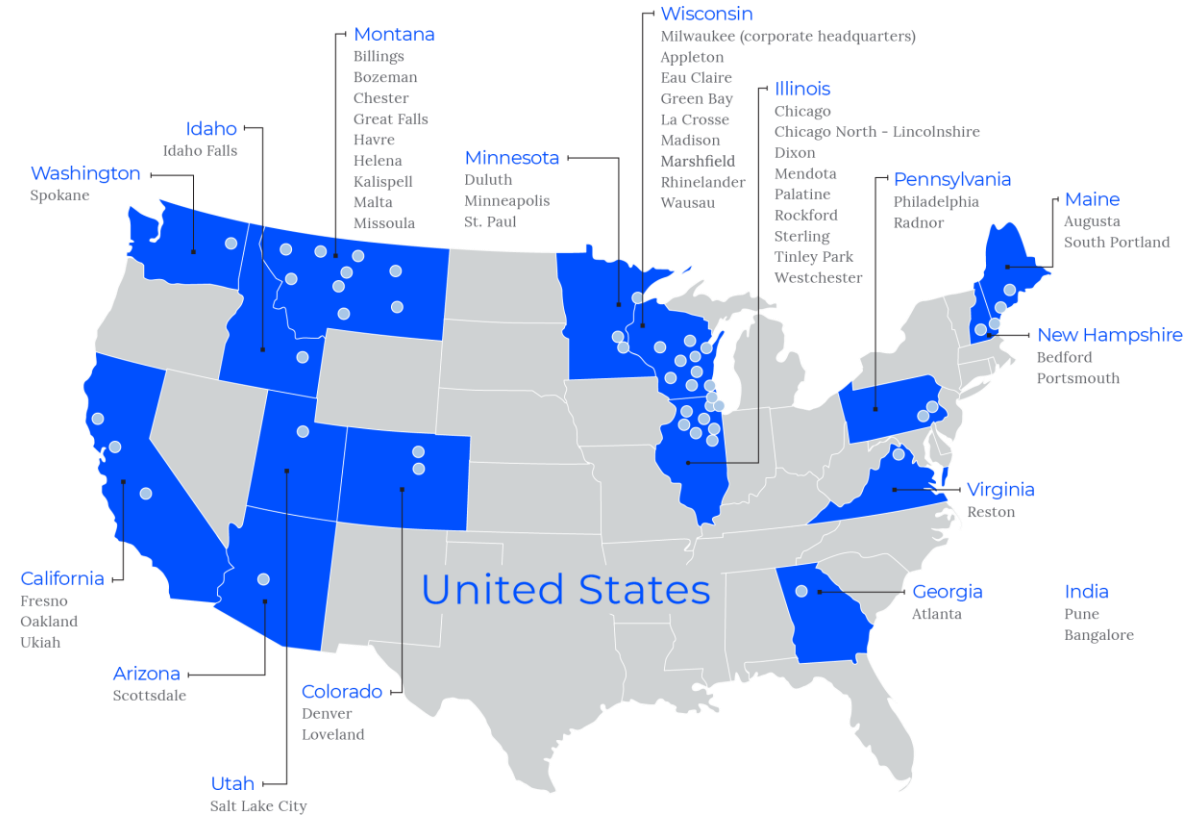
**Mo Abuali**

Director – Digital MRD

# Our Manufacturing Expertise

WIPFLI | DIGITAL

- Wipfli is a Top 20 progressive **accounting and consulting firm** committed to continuous improvement and relentless in its pursuit of its clients' success.
- Focus on **Manufacturing & Distribution** as our largest industry segment
- Serving clients for **over 90 years**
- 3,000+ employees worldwide offers our clients **global expertise** with local consultants



# WIPFLI

# Manufacturing and Distribution

WIPFLI | DIGITAL



## Audit, Accounting and Tax

- Internal audit
- Outsourced and interim accounting resources
- Maximizing credits and deductions: Research and development, Employee Retention, IC-DISC, WOTC, others



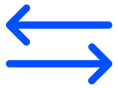
## Cybersecurity

- SOC for cybersecurity
- Risk assessment
- Policy development
- Managed detection and response
- IT audit
- Business continuity



## Technology Management

- Cloud deployment
- Office move and hardware purchasing
- Collaboration tools
- Health check
- Outsourced technology department



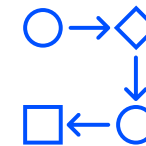
## Mergers & Acquisitions

- Long-term planning
- Buy and sell-side support
- Due diligence



## Digital Transformation

- Industry 4.0 and IIoT
- Business Intelligence
- Advanced Analytics
- CRM Solutions
- ERP Solution Deployment and Cross-Platform Integration
- CIO Advisory Services
- Web and Mobile Applications
- Software Selection



## Organizational Performance

- Supply Chain Risk
- Process Improvement
- Strategic Planning
- Job Costing
- Change Management



## Organizational Development

- Talent Acquisition
- Cultural Assessments
- Change Management
- Strategy
- Compensation Studies



## Training

- New Regulations and Best Practices
- Webinar based Lunch and Learns

Helping your company be market resilient.

# Today's Agenda

## **01 Setting the Stage**

Understanding Profitability

## **02 Data Readiness**

Data to Value to Profitability

## **03 Enabling Technology**

Leverage Industry 4.0 with Real Time Data & Analytics

## **04 Getting Started**

Think Big, Start Small, Act Now!

## Setting the Stage

# Understanding Job Profitability



Are we CURIOUS to understand which jobs are making the most?

Do we know where profitability is leaking on specific jobs?



# Understanding Job Profitability



Are our information systems providing us insights for better decision making?

How timely are those insights?

Is our uninformed or untimely JUDGEMENT clouding our decision making?



# More Than Granular Profitability



Financial statement impact

Capital investment impact

Cultural impact

Impact on the ability to borrow

Impact on business transition

Business valuation impact

- Levers to pull

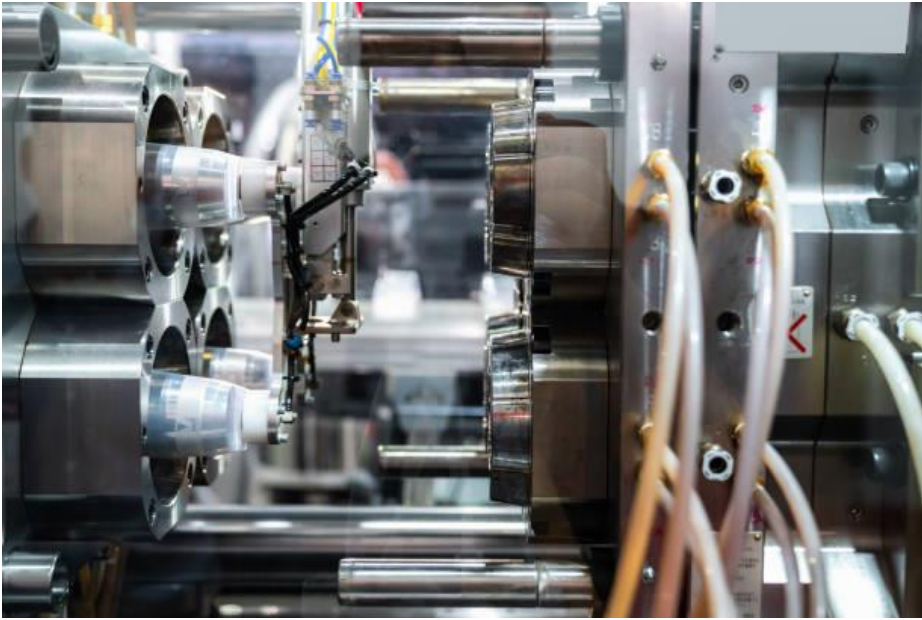
# Available Data for Possible Insights



Profit Visibility by:

- Job / part
- Work center
- Product families
- Customers
- Week, month, quarter

# Improvement: Focus on COGS

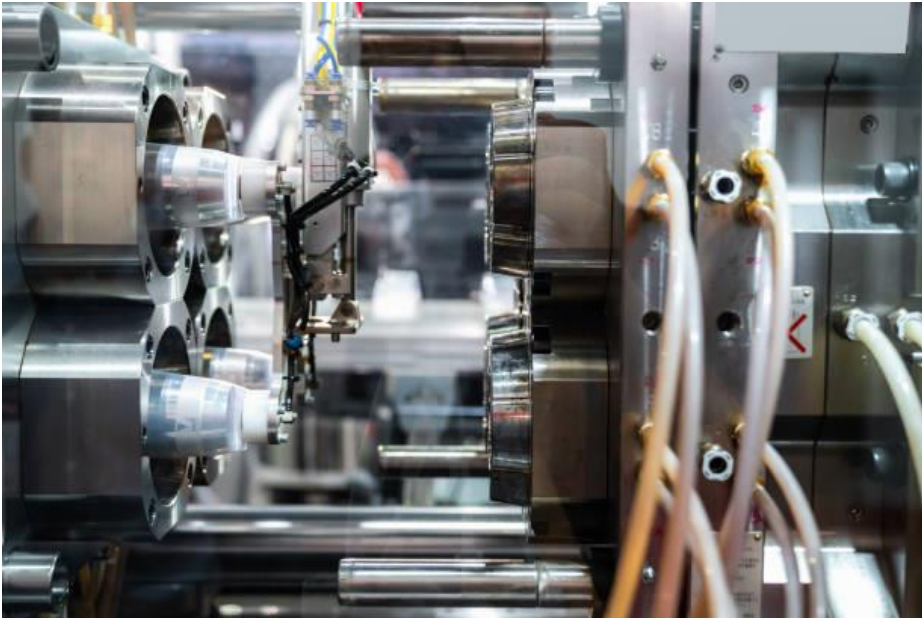


Direct labor hours

Direct material costs and related scrap

Manufacturing variances

# Improvement: Focus on COGS



Direct labor hours

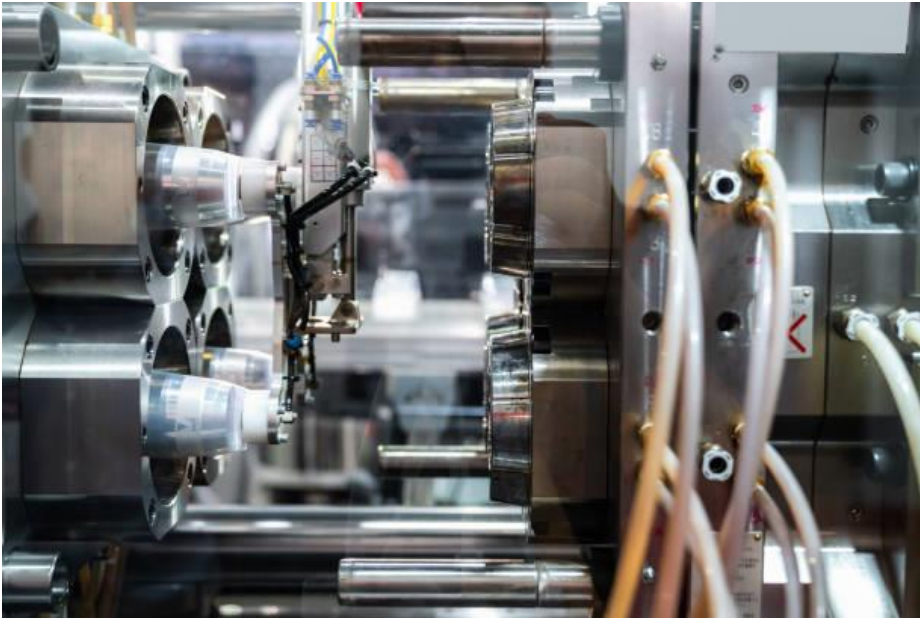
Direct material costs and related scrap

Manufacturing variances

Won't see instant P/L changes

But healthier decisions for better business health results

# Improvement: Focus on COGS



Profitability tuning

Take out direct costs

Take out indirect costs

Reduce purchasing and manufacturing variances

Increase output with the same assets and fixed OH costs



# Setting the Stage (1)

- **Do we know where we are making money and where profitability is leaking?**
  - Profit and margin by part and customer
- **Do our information systems provide us insights for better decision making?**
  - How timely is the data?
  - Do managers have the information quick enough to be effective?
- **Are we using our data?**
  - Information likely in disparate sources
  - Are you connecting production monitoring, process monitoring, and operator monitoring to your ERP or source of truth?



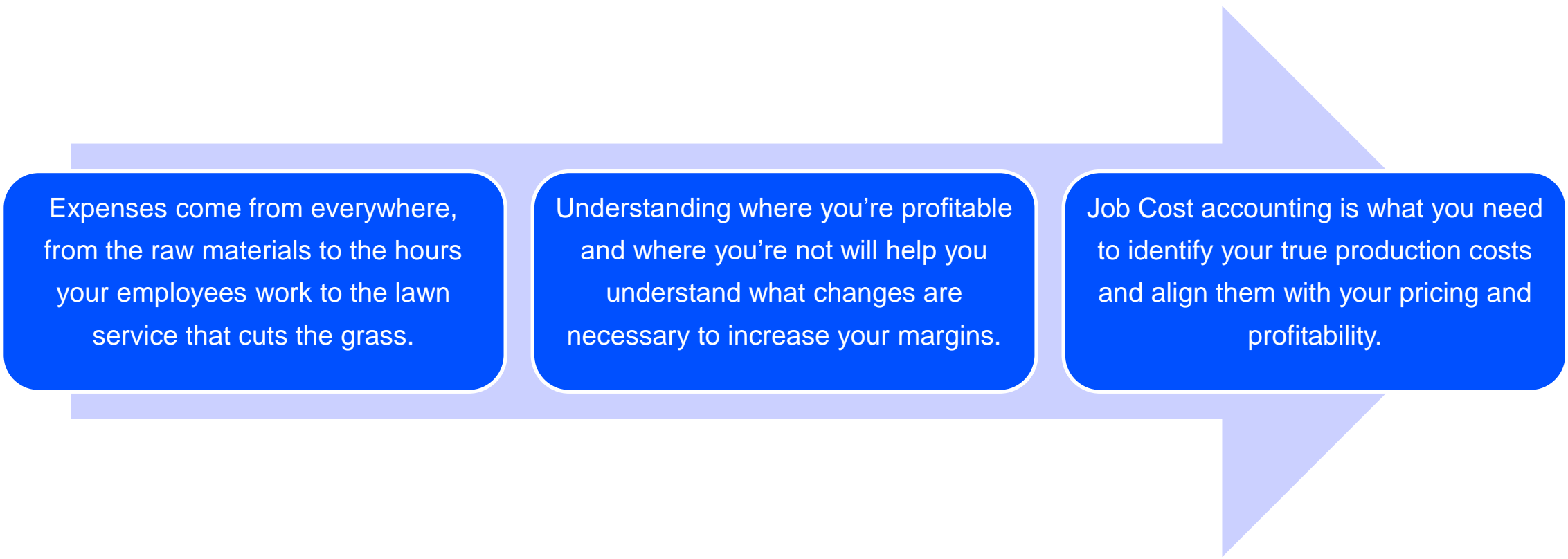
# Setting the Stage (2)

- **What insights are gained by delving into the profitability by:**
  - Job / part
  - Work center
  - Product families
  - Customers
- **Looking past granular profitability**
  - Impact on financial statements
  - Impact on capital investments
  - Cultural impacts
  - Business valuation impacts
    - What levers can we pull to improve EBITDA?



## **Data Readiness**

# Expenses



Expenses come from everywhere, from the raw materials to the hours your employees work to the lawn service that cuts the grass.

Understanding where you're profitable and where you're not will help you understand what changes are necessary to increase your margins.

Job Cost accounting is what you need to identify your true production costs and align them with your pricing and profitability.

# Good Data

*Understanding the critical few data points...*

*How large indirect expenses get absorbed*

*What work centers consume the most indirect expenses*

*Accuracy and timeliness of direct labor and material usage*

*Is the above understood and acted on across the organization*

## Progression of mfg. checks:

- ▶ Validation - mfg. routes
  - ▶ Conformation - mfg. standards
  - ▶ Assessment material usage
  - ▶ Review - set ups | change overs
- 80 | 20 applies
  - 90% accurate or directionally accurate

- Appropriate Overhead Cost Pools

- ▶ Variable
- ▶ Fixed
- ▶ Not visible to operations

- General ledger audit: (expense groups)

- ▶ Supervision wages
- ▶ Shop supplies
- ▶ Utilities
- ▶ Rent
- ▶ Depreciation
- ▶ Equipment repairs and maintenance
- ▶ Facility repairs and maintenance
- ▶ Warranty or rework



- Budget definition

- ▶ Location where production activities occur and are measured (work centers)
  - Mixing
  - Machining
  - Mills
  - Cutting
  - Molding
  - Injection molding
  - Assembly
  - Packaging

- Allocation Drivers

- ▶ Machine hours
- ▶ Labor hours
- ▶ Square feet
- ▶ Actual expenses

- Allocation workflow

- ▶ Listing of work centers
- ▶ Work Center budgets
  - Machine hours
  - Labor hours
  - Units

- Allocation rules

- ▶ This work center presents what percentage of whole
  - Machine hours
  - Labor hours
  - Space
  - Actual expenses
- ▶ Therefore, same % of the costs in this expense group will be allocated
- ▶ Repeat each expense group question for each work center

	Total building sqature footage	75,000																					
	Total Machine hours	10,000																					
	Total Direct labor hours	15,000																					
	TOTAL BUDGET	1,467,185																					
		Budgeted Expense Groups			Business Rule	Work Center ONE									Work Center TWO								
	Expense Groups	ANNUAL Budgeted amount	Percentage of TOTAL BUDGET	Critical FEW Expense Groups	Allocation Driver	Machine hours (annual)	Percentage of total machine hours	Direct labor hours	Percentage of total direct labor hours	Facility sqature footage	Percentage of total facility	OH allocation per labor hour	OH allocation per machine hour	Machine hours (annual)	Percentage of total machine hours	Direct labor hours	Percentage of total direct labor hours	Facility sqature footage	Percentage of total facility	OH allocation per labor hour	OH allocation per machine hour		
Number	Description																						
	Work Center Assumptions:					372	3.7%	372	2.48%	4,825	6.43%			585	5.85%	810	5.40%	1,200	1.60%				
	Wages																						
61210	Wages Indirect - Supervision	242,479	4.13%	4.13%	labor			6,013				16.17				13,094				16.17			
61215	Wages Indirect - Holiday	81,758	1.39%					2,028				5.45				4,415				5.45			
61310	Wages Indirect - Vacation Pay	212,480	3.62%	3.62%																			
61320	Wages Indirect - Funeral Pay	2,603	0.04%																				
61330	Wages Indirect - Miscellaneous	305,845	5.21%	5.21%																			
61410	Wages Indirect - Training	11,074	0.19%																				
61415	Wages Indirect - Tools & Fixtures	7,798	0.13%																				
61420	Wages Indirect - Material Handling	166,252	2.83%																				
61430	Wages Indirect - Shop Maintenance	15,400	0.26%																				
61440	Wages Indirect - Equip Maint	26,759	0.46%																				
61450	Wages Indirect - Grinding	8,774	0.15%																				
61460	FICA Tax Expense	270,803	4.61%	4.61%																			
61510	Medicare Tax Expense	63,560	1.08%																				
61515	FUI Tax Expense	5,920	0.10%																				
61520	SUI Tax Expense	19,666	0.34%																				
61530	Workmans Comp. Insurance Expense	145,076	2.47%																				
61610	Health/Life Insurance Expense	124,046	2.11%																				
61620	HSA Health Insurance Expense	6,800	0.12%																				
61630	Employee Welfare	85,578	1.46%																				
61710	Training, Seminars	5,449	0.09%																				
61715	Apprenticeship Program	2,389	0.04%																				
61716	Employee Tools	10,000	0.17%																				
61720	Miscellaneous Transportation	4,800	0.08%																				
	Supplies																						
62220	Shop Supplies	1,062,476	18.10%	18.10%	machine	39,524						106											
62310	Utilities - Shop	172,584	2.94%																				

03

**Enabling Technology**

Transition from Budgeting to  
*Monitoring and CONTROLLING*  
Costs and Profits

1. Opportunities for Continuous Improvement
2. Visibility into Schedule Attainment
3. Likelihood of Underperformance
4. Deeper Understanding of Profitability
5. Best Practices between Humans and Machines
6. Use of Energy

# The 4<sup>th</sup> Industrial Revolution Is Upon Us.

FROM INDUSTRY 1.0 TO INDUSTRY 4.0

## FIRST

### INDUSTRIAL REVOLUTION

Introduction of mechanical production facilities with the help of water and steam power



1784

First mechanical loom

## SECOND

### INDUSTRIAL REVOLUTION

Introduction of a division of labor and mass production with the help of electrical energy



1870

First assembly line

## THIRD

### INDUSTRIAL REVOLUTION

Use of electronic and IT systems that further automate production



1969

First programmable (PC)

## FOURTH

### INDUSTRIAL REVOLUTION

The Digital Connected World



2000

• Lean  
• Six Sigma

Principles of  
Scientific Management

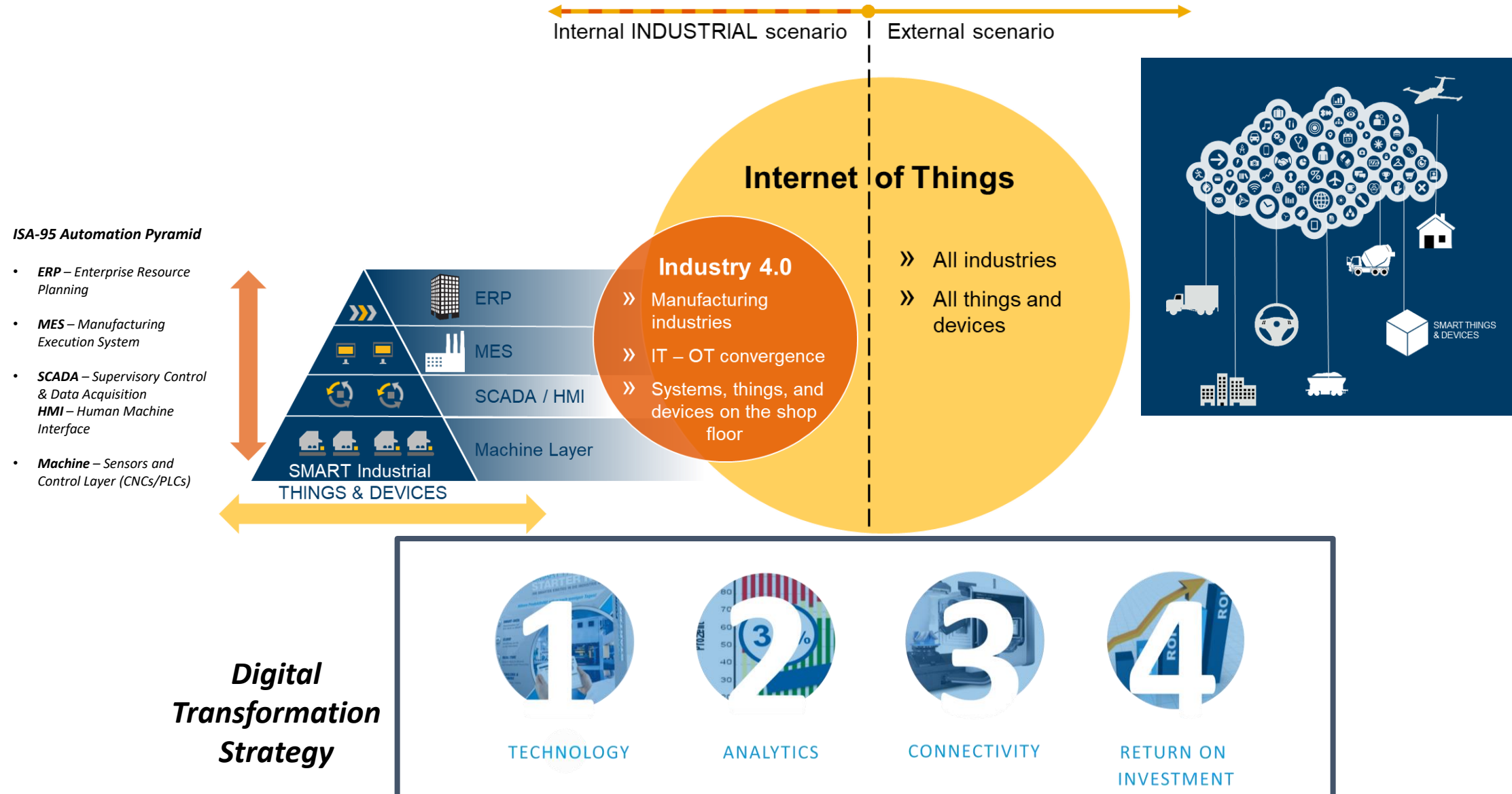
TQM

PRODUCTIVITY

**Industry 4.0 is about combining traditional manufacturing practices with the technological world.**

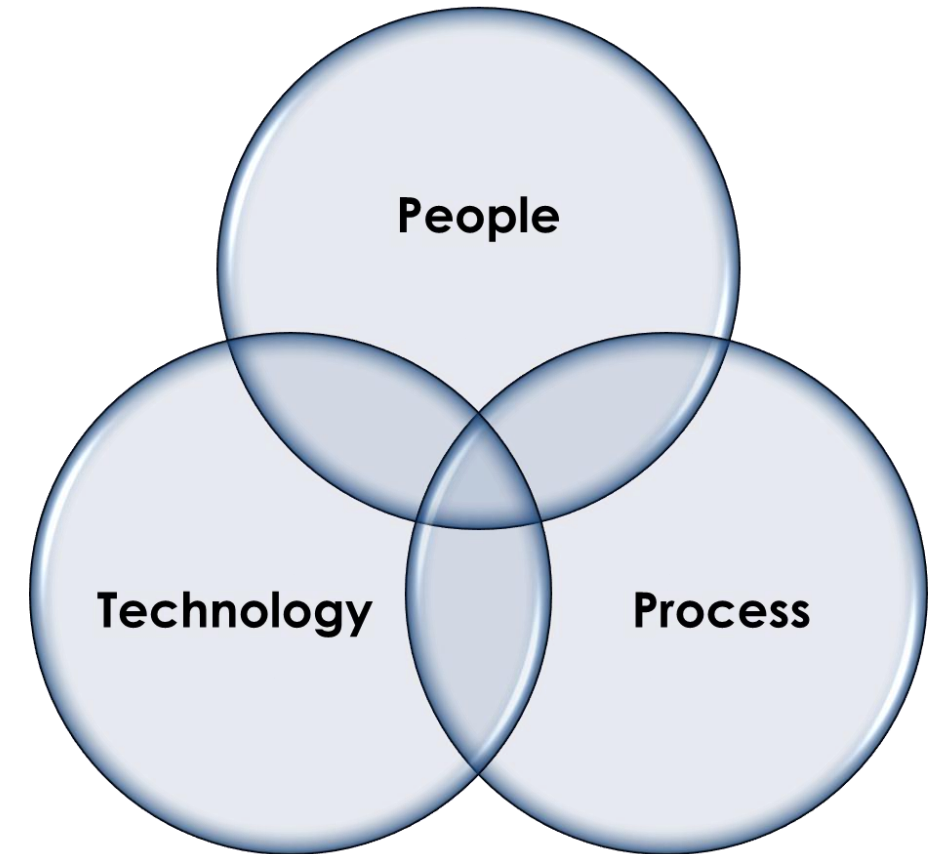


# IoT | IIoT | Industry 4.0



# Barriers to Industry 4.0 Entry

- **IT Systems (The Top Floor)**
  - Lack of a well deployed ERP and/or MES
- **Legacy Equipment (The Shop Floor)**
  - “End of Life” (but capable) equipment still being used
- **Workforce**
  - New skillsets required, and availability and aging of skilled trade workforce
- **New Processes**
  - Ingraining new processes around machine to machine and machine to human interface
- **Funding / ROI**
  - Access to capital and the ability to properly reinvest into the business



**People, Process, Technology → Profitability**

# The Business Case for I4.0



- **Real Time Data Collection and Visibility**

- Improve Overall Equipment Effectiveness (OEE)  
*Availability, Performance, Quality*



**5 to 10 % OEE Gains**  
**10 to 25% Labor Productivity**  
**10 to 20% Energy Reduction**

- **Predictive Maintenance**

- Reduced Unplanned Downtime
- Optimize Spare Parts
- Optimize P.M. Schedules and Labor



**1 to 5 % Uptime and Utilization Gains**



**10 to 20 % Spare Part Reduction**



**Improve MTBF / MTTR and Eliminate Overhead Maintenance**

- **Predictive Quality**

- Detect and Reduce Waste
- Cost of Quality and Inspections



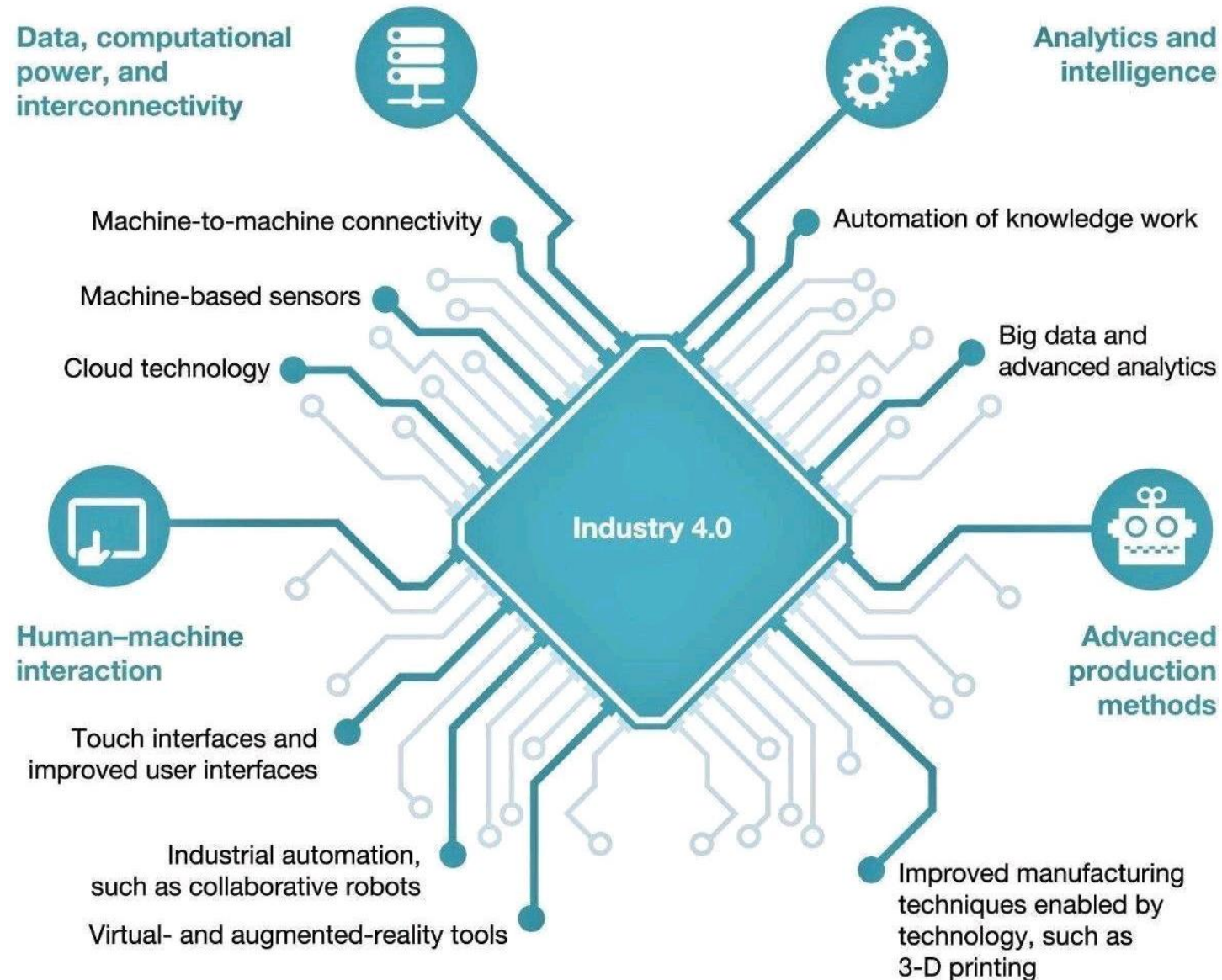
**1 to 5 % Scrap Reduction**



**\$500K per Plant Annually**

**Industry 4.0 Drives Zero-Downtime, Zero-Defects, Sustainable Manufacturing  
and strives to Achieve 100% ROI within 3 to 12 Months**

# I4.0 Disruptive Technologies

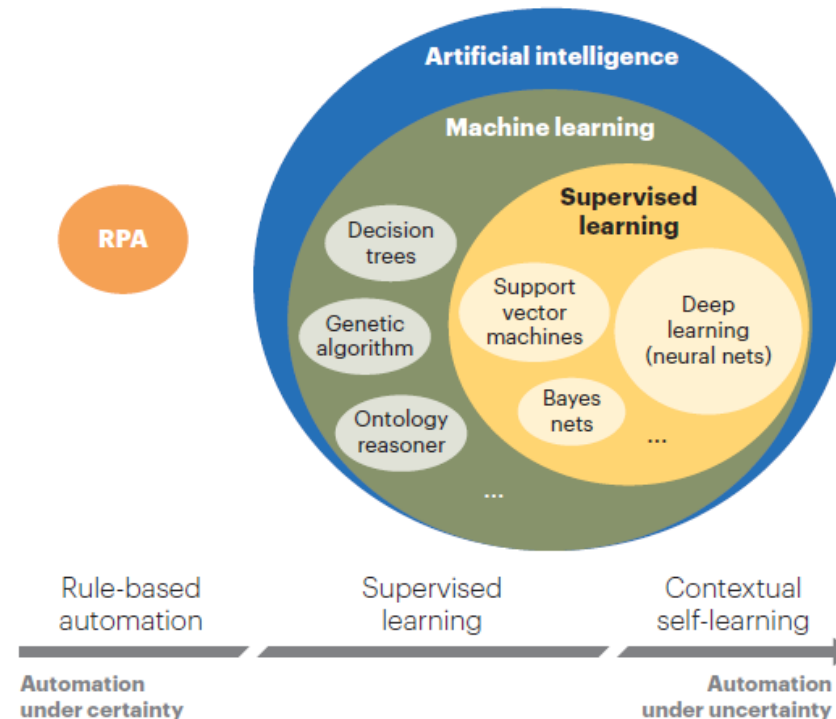


Source: McKinsey

# Artificial Intelligence (AI)

- **AI** is the science of getting computers to act intelligently without being explicitly programmed
- **Machine Learning (ML)** is a subdiscipline of AI focused on using math-based algorithms and software to mimic smart actions, whose performance improves as a function of training data
- **Deep Learning (DL)** is a subdiscipline of ML that has made recent breakthroughs and is based on neural networks that mimic how brain neurons learn

Machine learning, and particularly deep learning, has accelerated in the past decade



Source: A.T. Kearney analysis

**Robotic process automation (RPA):**  
Virtual resources that can automate highly repetitive, structured tasks with very specific, linear decision criteria

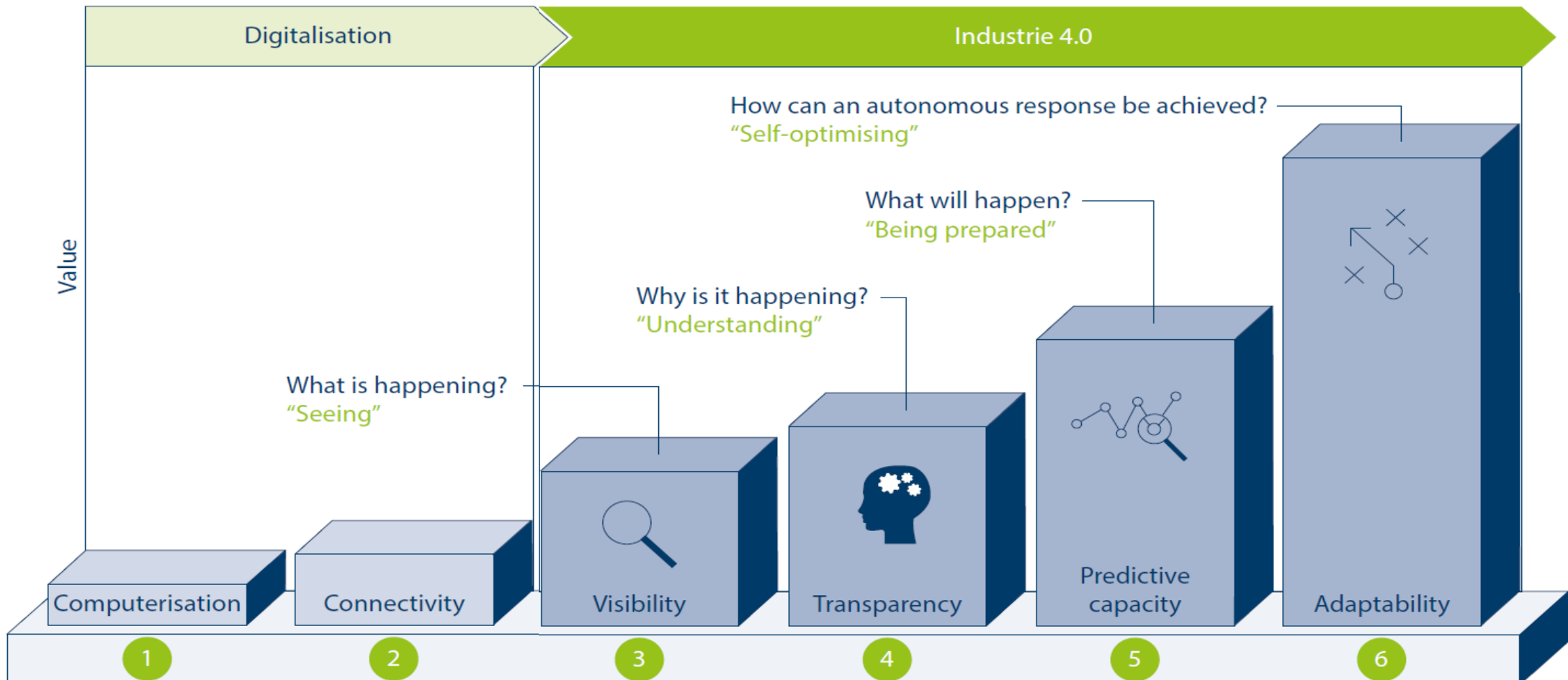
**Artificial intelligence (AI):**  
The discipline of making analytical machines intelligent, enabling an entity to function appropriately and with foresight in its environment

**Machine learning:**  
Techniques for learning and performing cognitive functions (examples include algorithms for supervised and unsupervised learning)

**Deep learning:**  
A statistical machine-learning approach based on deep neural networks that attempts to mimic brain architecture for learning

# What is your Digital Maturity?

*Industry 4.0 is the initiative driving smart manufacturing forward toward “digital maturity”*



Transition from Budgeting to  
*Monitoring and CONTROLLING*  
Costs and Profits

1. Opportunities for Continuous Improvement
2. Visibility into Schedule Attainment
3. Likelihood of Underperformance
4. Deeper Understanding of Profitability
5. Best Practices between Humans and Machines
6. Use of Process & Energy Data



## (1) Opportunities for Continuous Improvement...

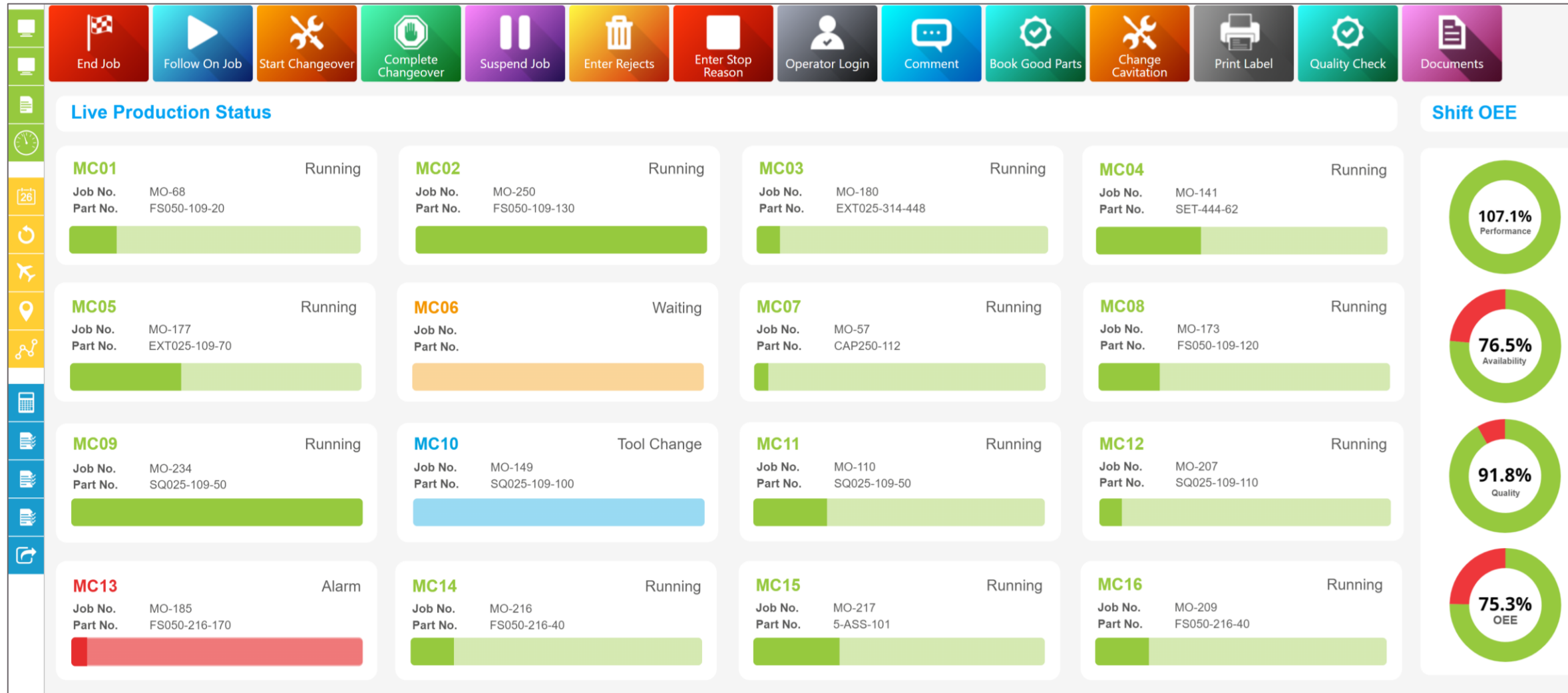
In search of:

- Real time visibility and 'status at a glance' (machine, job, part, person)
- Reasons and frequency/size for unplanned downtime events, and where they accumulate
- Where downtime events accumulate relative to distinct jobs and parts



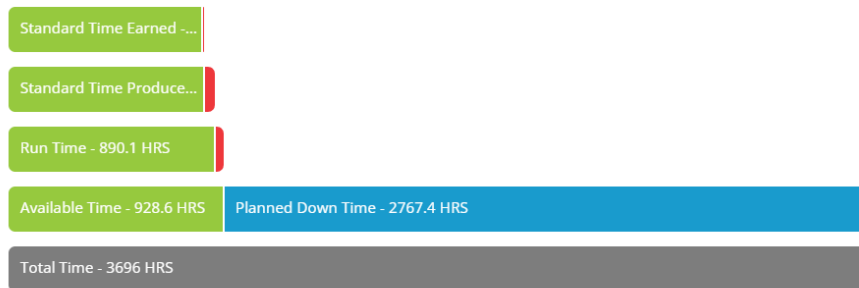
# Visibility and 'Status at a Glance'

(by Job / Part / Tool)

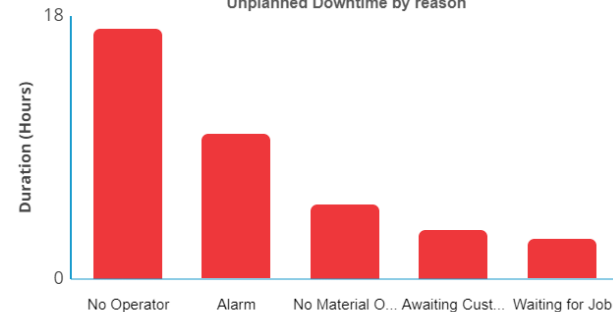


# Visibility into OEE and Downtime

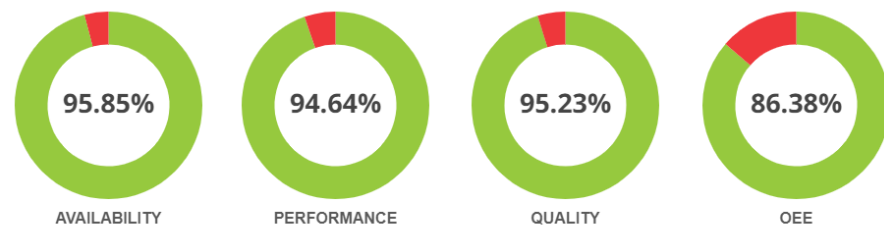
Overall Equipment Effectiveness



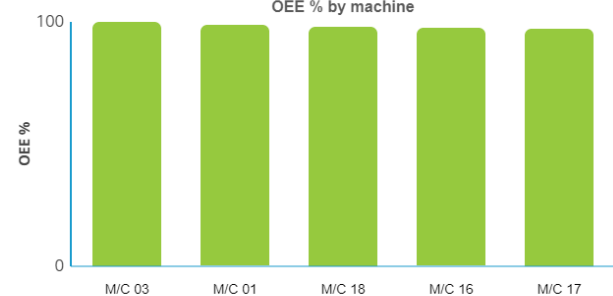
Unplanned Downtime by reason



Tip: Drag to Scroll



OEE % by machine



Tip: Click on a bar to drill down

Machine	Shift	Job	Part	Zone					
Production Report									
From: 06/05/2019 06:00									
To: 13/05/2019 06:00									
Machine	Potential Time	Planned Down Time	Available Time	Unplanned Down Time	Run Time	Availability (%)	Performance (%)	Quality (%)	OEE (%)
IM 013	168.0	0.0	168.0	126.0	42.0	25.0	90.3	100.0	22.6
IM 014	168.0	0.0	168.0	167.9	0.1	0.1	25785.8	100.0	13.3
IM 015	168.0	0.0	168.0	167.6	0.4	0.2	510.0	100.0	1.2
IM 016	168.0	0.0	168.0	81.8	86.2	51.3	89.6	100.0	46.0
IM 019	168.0	0.0	168.0	83.3	84.7	50.4	103.5	100.0	52.2
IM 017	168.0	0.0	168.0	79.7	88.3	52.6	113.5	100.0	59.7
IM 018	168.0	76.5	91.5	60.8	30.7	33.6	85.9	100.0	28.9
IM 026	168.0	0.0	168.0	34.5	133.5	79.5	86.7	100.0	68.9
Unscheduled	168.0	168.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	1512.0	244.5	1267.5	801.5	466.0	36.8	100.8	100.0	37.1

## (2) Visibility into Schedule Attainment...

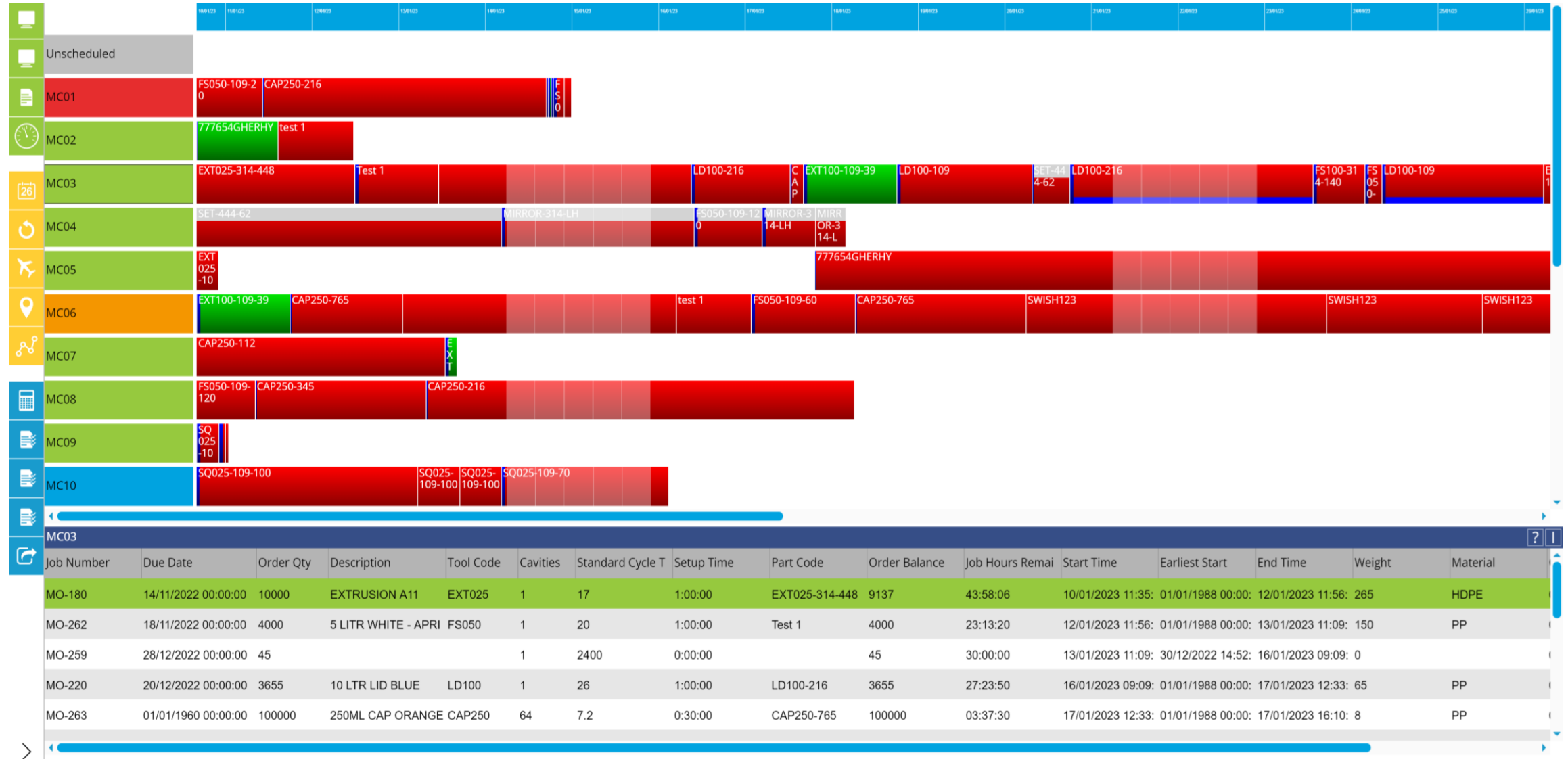
In search of:

- Current state of active jobs/work orders and completion predictions
- Impact on downstream routings and future work center loads

# Current State of Active Jobs/Parts



# Scheduling (Constraint-based)



### (3) Likelihood of Underperformance...

In search of:

- What manufacturing jobs are in queue and how those jobs previously performed?
- What were the reasons they out paced performance expectations or under performed?

# Order/Part Performance

- Home
- Home 2
- Summary
- Performance

- Schedule
- Shift Profile
- Planner
- Event Viewer
- Cycle Profile

- MESi Reports
- Production Reports
- Downtime Reports
- Reject Reports
- MESi Export

## Material Requirements

Expected Start Time	Order Number	Order Quantity	Part Code	Material	Part Weight	Material Quantity
Machine: MC01 / Injection						
Today 15:43	MO-68	4000	FS050-109-20	STEEL 45678-45	150	600000
Tomorrow 11:33	MO-135	2500000	CAP250-216	PP	8	20000000
Sat 14 Jan 18:11	MO-219	2500	CAP250-765	PP	8	20000
Sat 14 Jan 18:45	MO-238	5000	CAP250-216	PP	8	40000
Sat 14 Jan 19:28	MO-249	1500000	CAP250-765	PP	8	12000000
Sat 14 Jan 19:28	MO-258	5000	CAP250-345	PP	8	40000
Sat 14 Jan 20:08	MO-264	348	FS050-109-120	PP	150	52200
Sat 14 Jan 20:08	MO-265	348	FS050-109-120	PP	150	52200
Machine: MC02 / Injection						
Today 15:43	MO-250	1350	FS050-109-130	PP	150	202500
Today 15:43	MO-256	10000	777654GHERHY	COPPER123	0	0
Today 15:43	MO-203	5000	test 1		0	0
Machine: MC03 / Injection						
Today 15:43	MO-180	10000	EXT025-314-448	HDPE	265	2650000
Thu 12 Jan 08:55	MO-262	4000	Test 1	PP	150	600000
Fri 13 Jan 08:08	MO-259	45			0	0
Mon 16 Jan 06:08	MO-220	3655	LD100-216	PP	65	237575
Tue 17 Jan 09:32	MO-263	100000	CAP250-765	PP	8	800000

## Report Options

- Export Format XLSX (Excel) ▼
- Machines MC01, MC02, MC0...
- Start Time 10/01/2023 15:43:00
- End Time 17/01/2023 15:43:00

Work To List

Material Requirements

Material Summary

Labour Forecast

Capacity Report

Tool Change Report

Export

Cancel

## (4) Understanding Profitability...

In search of:

- What customers are the most and least profitable?
- What sequential workflows (work centers) generate profits or erode profits?
- Where are manufacturing variances and patterns likely to occur?



# Customers and Mfg. Variances (1)

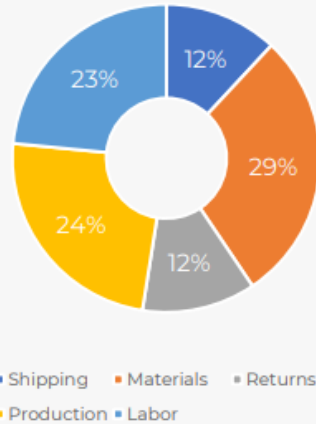
## Cost and Expense Analysis

Dynamic Axis: Product Category | Product Segment | Product Line | Service | Department

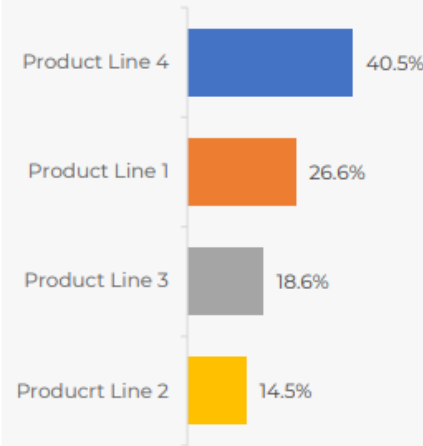
### Report Filters

- ☐ Year
- ☐ Quarter
- ☐ Month
- ☐ Week
- ☐ Location
- ☐ Product Line
- ☐ Product Category
- ☐ Product Segment
- ☐ Service
- ☐ Product
- ☐ Department

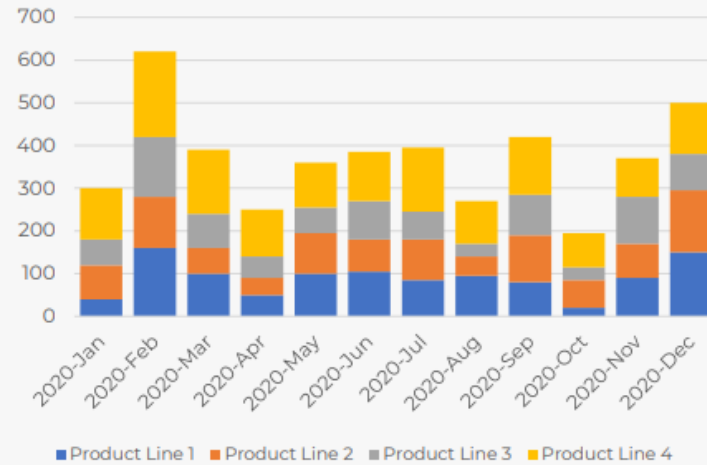
### Cost of Goods Sold



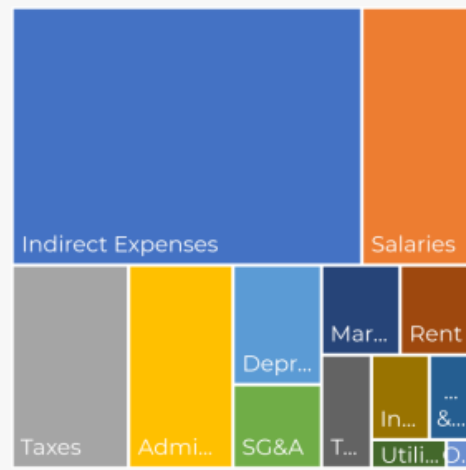
### COGS (Dynamic Axis)



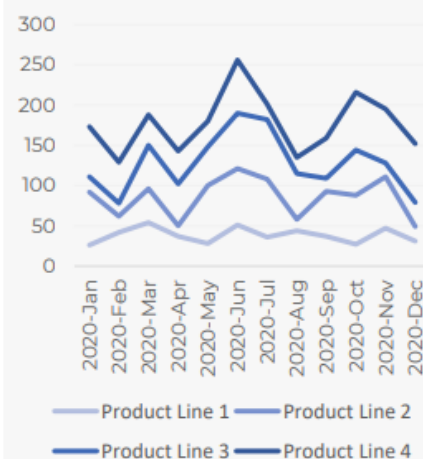
### Expenses Trending (Dynamic Axis)



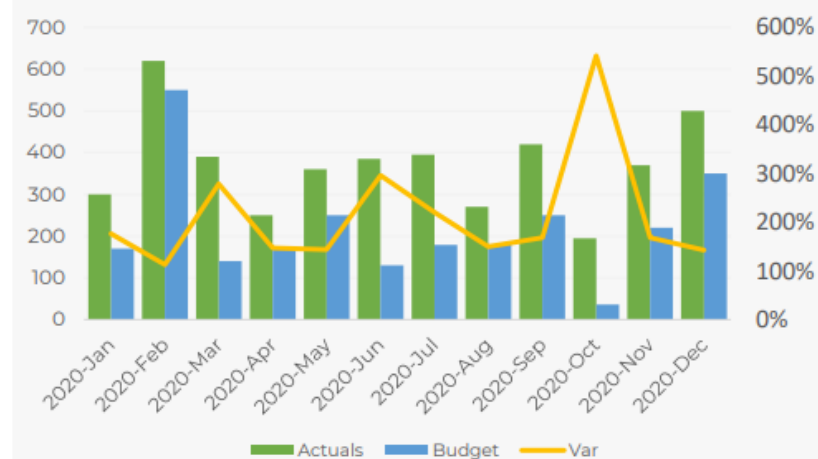
### Expense Breakdown by Type



### COGS Trending (Dynamic Axis)



### Expense Trending: Actuals vs Budget



# Customers and Mfg. Variances (2)

## Invoiced Sales Analysis

Invoiced Revenue

\$26.18M

Invoiced Order Count

69.75K

Expedited Order %

16.8%

Average Order Amt

\$375.3

Customer Count

2.5K

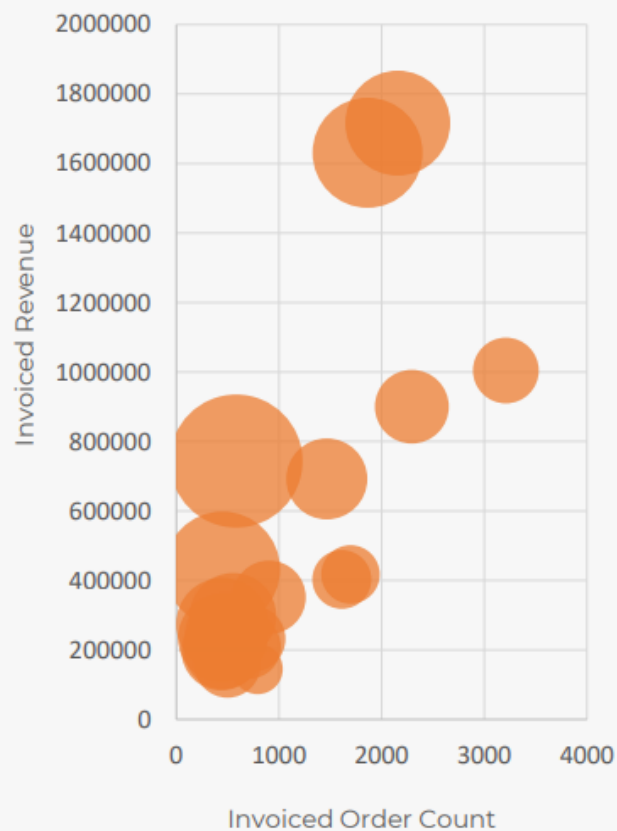
Products per Customer

3.4

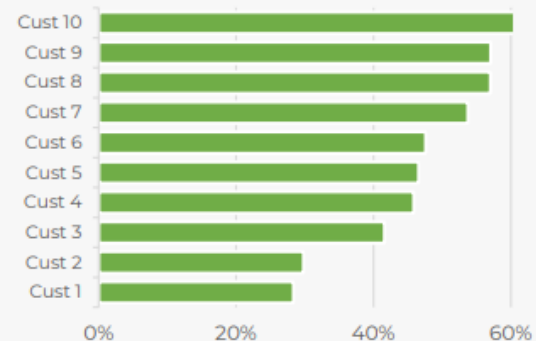
### Report Filters

- ☐ Year
- ☐ Quarter
- ☐ Month
- ☐ Week
- ☐ Territory
- ☐ Division
- ☐ Production Group
- ☐ Production Line
- ☐ Product Line
- ☐ Product
- ☐ Customer

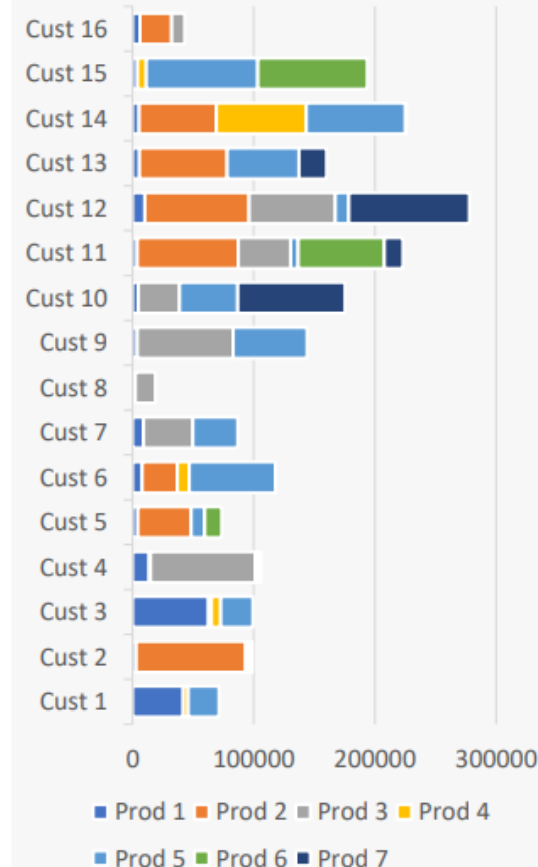
### Net Profit vs Profit Margin vs Net Sales

View By: **Product** | Customer

### Expedited Order %

View By: **Customer** | Product

### Invoiced Revenue by Customer and Product



### Average Invoiced Order Amount Trending



## (5) Best Practices between Humans and Machines...

In search of:

- Which machine, part and human interaction produce results better than standard?
- Which machine, part and human interaction run below standard and when accumulated impact profitability?

# Analytics by JOB

Part Code	Description	Job Number	MC	Tool Code	Impressions	Standard Cy...	Average Cy...	Good Parts	Scrap Parts	Total Parts	Total Time	Run Time	Planned Do...	Unplanned ...	No. of Stops	Performance	Availability
M00416 Sol...	M00416 Sol...	22548	M/C 01	AP332	1	20	20	1187	0	1187	24:00:00	6:35:40	0:00:00	17:24:19	18	100	27.48
EC3C 5480...	EC3C 5480...	22381	M/C 03	AP335	1	80	77.23	314	0	314	24:00:00	6:44:09	0:00:00	17:15:50	9	103.59	28.07
211.5 Whistl...	211.5 Whistl...	22294	M/C 05	AP495	1	22	22.85	964	0	964	24:00:00	6:07:06	0:00:00	17:52:53	22	96.28	25.49
2 imp Tray ...	2 imp Tray ...	22288	M/C 07	AP421	2	16	16.96	2714	0	2714	24:00:00	6:23:41	0:00:00	17:36:18	23	94.31	26.64
1" Nut White	1" Nut White	22362	M/C 08	AP199	8	26	26.89	7040	0	7040	24:00:00	6:34:24	0:00:00	17:25:35	20	96.68	27.39
BP3H Plugs ...	BP3H Plugs ...	22550	M/C 09	Assy	12	12	12.94	20808	0	20808	24:00:00	6:13:55	0:00:00	17:46:04	34	92.75	25.97
1724-4 Kit 3 ...	1724-4 Kit 3 ...	22384	M/C 10	Assembly	1	30	31.12	809	0	809	24:00:00	6:59:38	0:00:00	17:00:21	11	96.39	29.14
FSE Caps	FSE Caps	22271	M/C 11	AP309	4	14	15.05	6116	0	6116	24:00:00	6:23:25	0:00:00	17:36:34	21	93.05	26.63
M00415 Hou...	M00415 Hou...	22547	M/C 12	AP352	1	34	48.5	497	0	497	24:00:00	6:41:46	0:00:00	17:18:13	13	70.1	27.9
CC-1.25 Inle...	CC-1.25 Inle...	22486	M/C 14	AP524	4	43	58.62	1620	0	1620	24:00:00	6:35:43	0:00:00	17:24:16	16	73.35	27.48
P-ARB-1-Me...	P-ARB-1-Me...	22441	M/C 15	ASSY /AP210	1	47	48.77	502	0	502	24:00:00	6:48:03	0:00:00	17:11:56	14	96.37	28.34
M964 Reflec...	M964 Reflec...	22270	M/C 16	AP486	1	59	59.24	398	0	398	24:00:00	6:32:58	0:00:00	17:27:01	13	99.59	27.29
660 Red Body	660 Red Body	22292	M/C 17	1708 / AP398	4	38	38.86	2536	0	2536	24:00:00	6:50:36	0:00:00	17:09:23	14	97.79	28.51
Alpha 210.5 ...	Alpha 210.5 ...	22283	M/C 18	AP441	4	60	60	1576	0	1576	24:00:00	6:34:00	0:00:00	17:25:59	15	100	27.36
Total								47081	0	47081	24:00:00	92:05:08	0:00:00	243:54:51	243	93.59	27.41

# Analytics by PART

Part	Description	Potential Ti...	Run Time	Total Down ...	Stoppages	Waiting for ...	Plant Shutd...	Alarm	Changeover...	Changeover...	No Job	Tool Change	Insert change
		2171:09:57	0:00:00	2171:09:57	0	2:41:10	572:58:47	0:00:00	0:00:00	0:00:00	1575:30:00	0:00:00	0:00:00
M00416 Sol...	M00416 Sol...	72:34:39	63:59:04	8:35:34	196	0:00:00	7:40:58	0:46:17	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00
Quintip Singl...	Quintip Singl...	4:53:23	4:17:04	0:36:18	15	0:00:00	0:05:49	0:30:28	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00
EC3C 5480...	EC3C 5480...	72:34:29	66:26:16	6:08:13	80	0:00:00	5:30:35	0:31:38	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00
211.5 Whistl...	211.5 Whistl...	72:34:22	64:04:09	8:30:12	189	0:00:00	7:39:58	0:46:25	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00
2 imp Tray ...	2 imp Tray ...	72:34:14	63:58:53	8:35:20	206	0:00:00	7:59:43	0:25:03	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00
1" Nut White	1" Nut White	72:34:09	62:49:45	9:44:24	205	0:00:00	8:41:19	0:57:09	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00
BP3H Plugs ...	BP3H Plugs ...	72:34:05	56:42:34	15:51:31	197	0:00:00	8:17:25	0:00:00	7:34:05	0:00:00	0:00:00	0:00:00	0:00:00
1724-4 Kit 3 ...	1724-4 Kit 3 ...	72:34:00	63:32:55	9:01:05	172	0:00:00	7:57:14	0:59:29	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00
FSE Caps	FSE Caps	72:33:57	63:21:16	9:12:41	199	0:00:00	8:18:13	0:54:12	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00
M00415 Hou...	M00415 Hou...	72:33:54	62:48:45	9:45:08	182	0:00:00	8:27:12	1:01:52	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00
CC-1.25 Inle...	CC-1.25 Inle...	72:33:51	61:41:52	10:51:58	182	0:00:00	10:11:58	0:40:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00
P-ARB-1-Me...	P-ARB-1-Me...	72:33:48	63:33:09	9:00:38	139	0:00:00	8:24:21	0:36:16	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00
M964 Reflec...	M964 Reflec...	72:33:45	64:55:37	7:38:08	109	0:00:00	7:01:03	0:32:55	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00
660 Red Body	660 Red Body	72:33:41	63:48:59	8:44:42	157	0:00:00	8:05:36	0:28:15	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00
Alpha 210.5 ...	Alpha 210.5 ...	72:33:38	64:02:57	8:30:40	130	0:00:00	7:58:47	0:31:53	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00
<b>Total</b>		<b>3192:00:00</b>	<b>890:03:22</b>	<b>2301:56:37</b>	<b>2358</b>	<b>2:41:10</b>	<b>685:19:06</b>	<b>9:41:58</b>	<b>7:34:05</b>	<b>0:00:00</b>	<b>1575:30:00</b>	<b>0:00:00</b>	<b>0:00:00</b>

# Analytics by TOOL

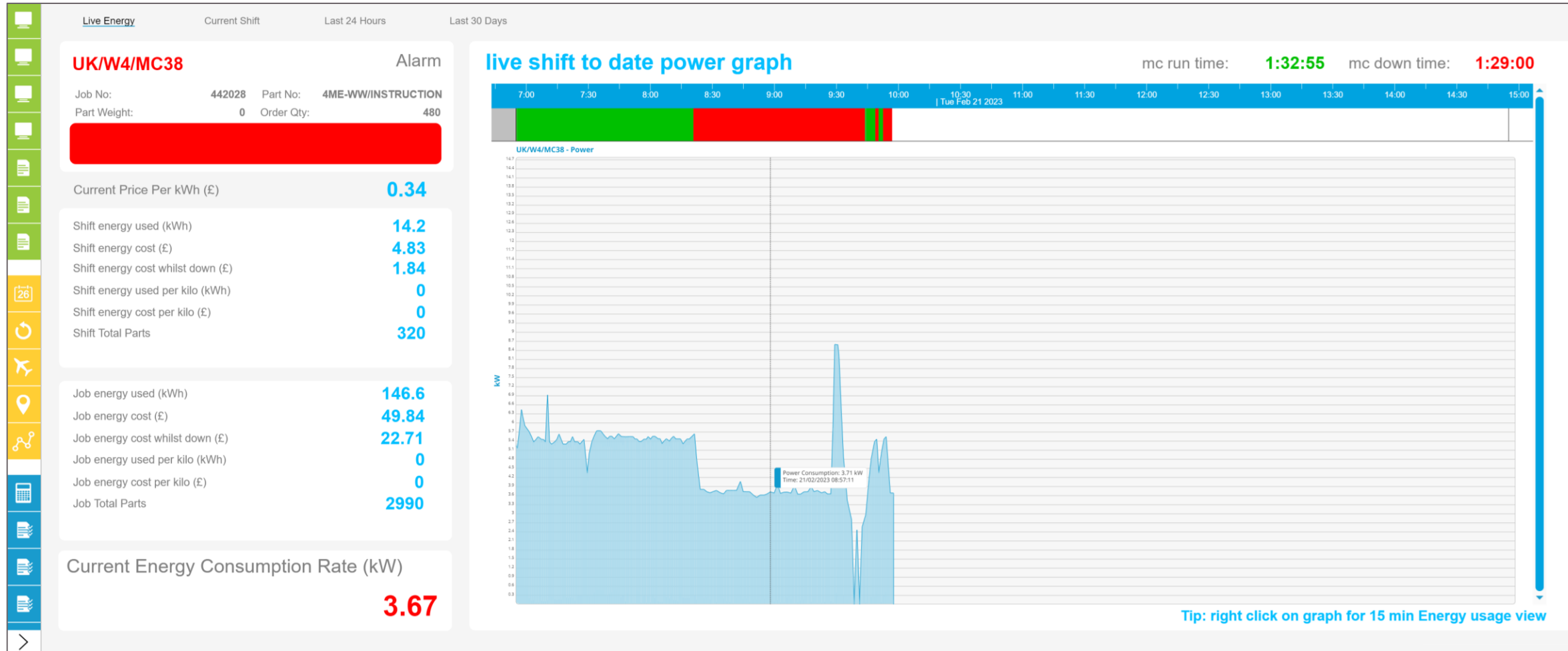
Tool	Potential Ti...	Run Time	Total Down ...	Stoppages	Waiting for ...	Plant Shutd...	Alarm	Changeover...	Changeover...	No Job	Tool Change	Insert change
	2171:09:57	0:00:00	2171:09:57	0	2:41:10	572:58:47	0:00:00	0:00:00	0:00:00	1575:30:00	0:00:00	0:00:00
AP332	72:34:39	63:59:04	8:35:34	196	0:00:00	7:40:58	0:46:17	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00
AP175	4:53:23	4:17:04	0:36:18	15	0:00:00	0:05:49	0:30:28	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00
AP335	72:34:29	66:26:16	6:08:13	80	0:00:00	5:30:35	0:31:38	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00
AP495	72:34:22	64:04:09	8:30:12	189	0:00:00	7:39:58	0:46:25	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00
AP421	72:34:14	63:58:53	8:35:20	206	0:00:00	7:59:43	0:25:03	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00
AP199	72:34:09	62:49:45	9:44:24	205	0:00:00	8:41:19	0:57:09	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00
Assy	72:34:05	56:42:34	15:51:31	197	0:00:00	8:17:25	0:00:00	7:34:05	0:00:00	0:00:00	0:00:00	0:00:00
Assembly	72:34:00	63:32:55	9:01:05	172	0:00:00	7:57:14	0:59:29	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00
AP309	72:33:57	63:21:16	9:12:41	199	0:00:00	8:18:13	0:54:12	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00
AP352	72:33:54	62:48:45	9:45:08	182	0:00:00	8:27:12	1:01:52	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00
AP524	72:33:51	61:41:52	10:51:58	182	0:00:00	10:11:58	0:40:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00
ASSY /AP210	72:33:48	63:33:09	9:00:38	139	0:00:00	8:24:21	0:36:16	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00
AP486	72:33:45	64:55:37	7:38:08	109	0:00:00	7:01:03	0:32:55	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00
1708 / AP398	72:33:41	63:48:59	8:44:42	157	0:00:00	8:05:36	0:28:15	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00
AP441	72:33:38	64:02:57	8:30:40	130	0:00:00	7:58:47	0:31:53	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00
<b>Total</b>	<b>3192:00:00</b>	<b>890:03:22</b>	<b>2301:56:37</b>	<b>2358</b>	<b>2:41:10</b>	<b>685:19:06</b>	<b>9:41:58</b>	<b>7:34:05</b>	<b>0:00:00</b>	<b>1575:30:00</b>	<b>0:00:00</b>	<b>0:00:00</b>

## (6) Use of Process and Energy Data

In search of:

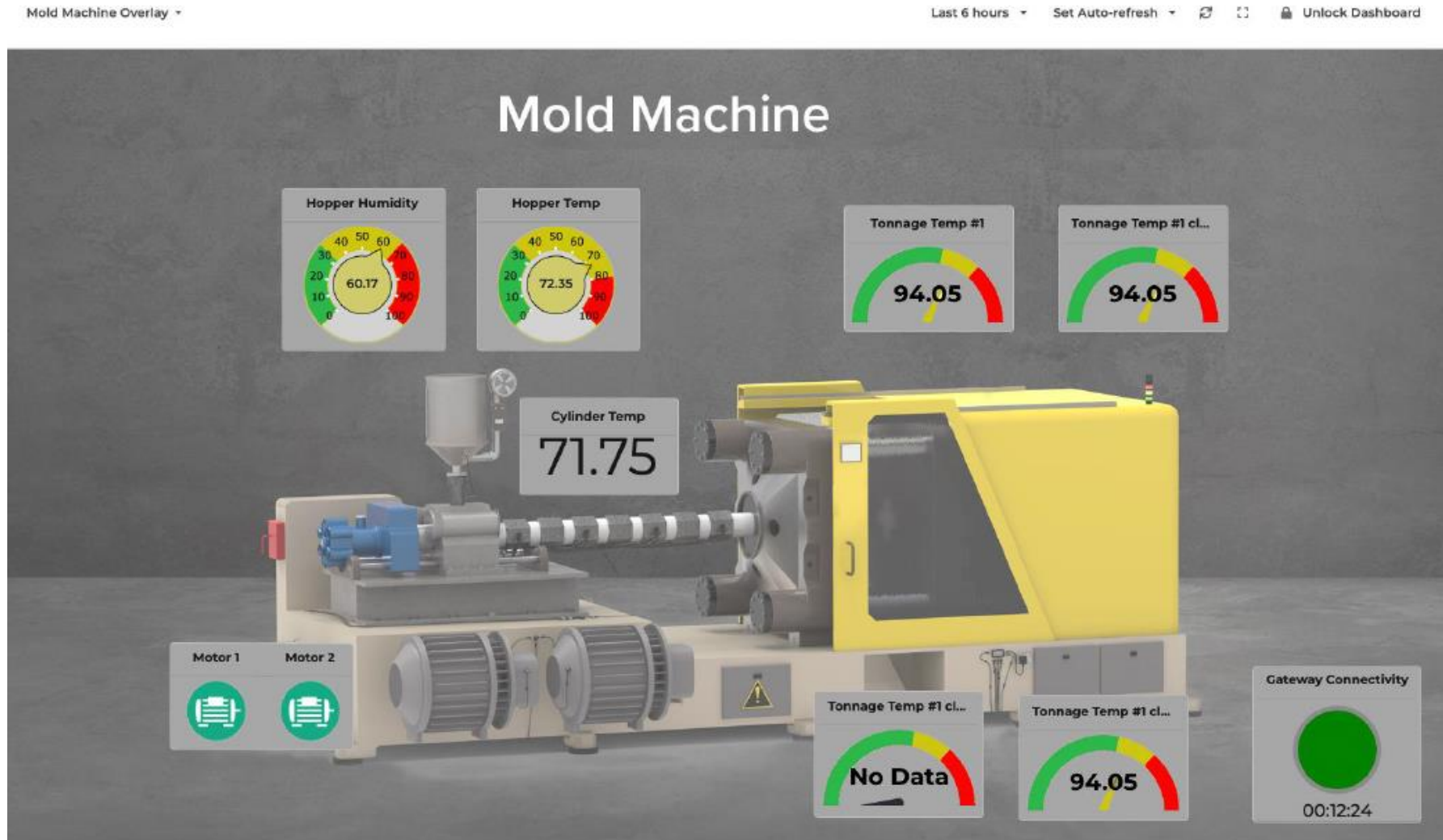
- Are the machine process parameters in spec / in control?
- What resources are consuming energy and at what costs?

# Live ENERGY Data and Costing





# Process Monitoring

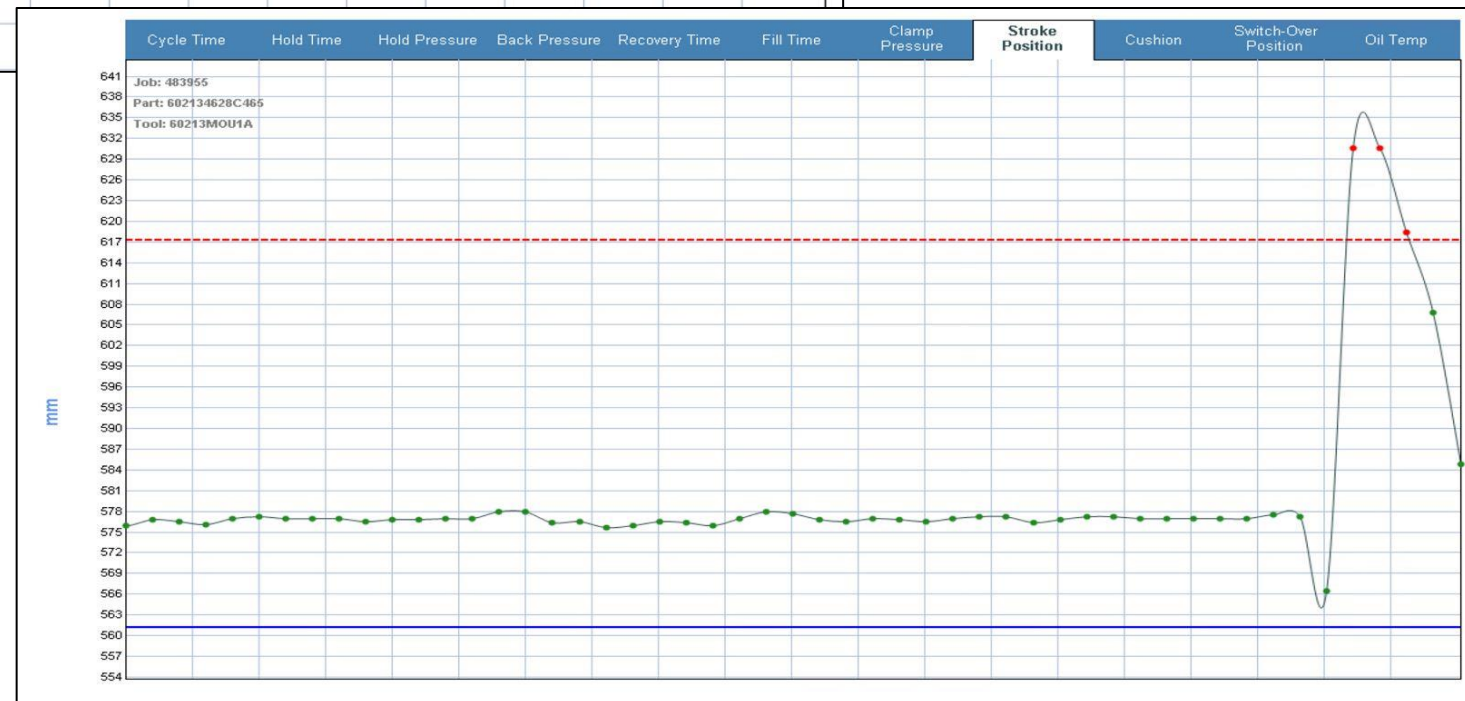


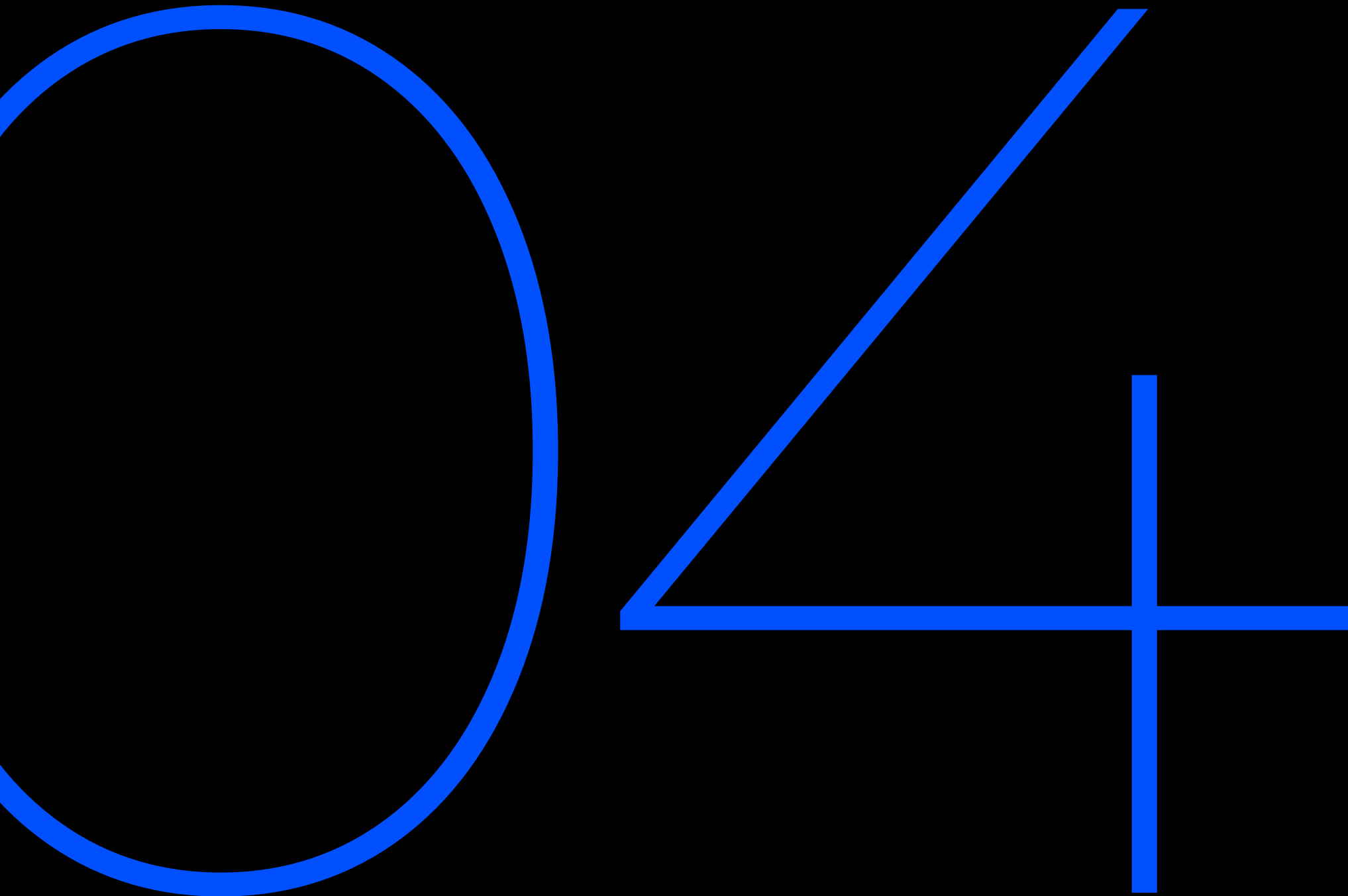
# Process Control



## 10 Key Molding Parameters:

- Cycle Time
- Fill Time
- Hold Time
- Recovery Time
- Pressure (Hold / Clamp / Back / Peak)
- Stroke Position
- Oil Temperature





**Getting  
Started**

## Mike Slides

- 3 minutes of wrap up

# The I4.0 Journey

Think Big → Start Small → Prove Value → Scale Fast

## Assessment

- Assemble Team
- Identify Plant
- Assessment of Digital Maturity People/Process/Technology
- Discuss Use Case
  - Technical
  - Business

## I4.0 Workshop(s)

- Plant Visit
- Baseline Review of Current Systems, Processes, Technologies
- Confirm Critical Workplaces, Data Collection, and Technical Strategy
- Document Business Case (ROI)

### GAP Analysis

People

Process

Technology

*Identify the ideal end state, while focusing on those areas which will achieve a ROI.*

### Statement of Work

Hardware

Software

Services

*Assemble technical proposal, highlighting required components, such as infrastructure, sensors, software and services..*

## Proof of Value

- Review Findings
- Technical Deployment
- Training
- Achieve ROI

## Scale

- Lessons Learned and Best Practices
- Template(s)
- Center of Excellence (CoE)

DISCOVER

DESIGN

DELIVER

# Getting Started

- **Start with WHY**
  - What is The Business Case for your Industry 4.0 digital journey?
- **Follow a Systematic Approach and Make it Operational**
  - Think Big → Start Small → Prove Value → Scale Fast
- **Start your Journey with an Industry 4.0 Assessment**
  - Assess your Digital Maturity, across People, Process, Technology
  - Roadmap your I4.0 Strategy with an ROI Mindset
- **Act Now!**
  - Stay ahead of the curve

## Contact Us!



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