# SOCMA Show

Adapting Supply Chains for a Changing World

socma
SOLUTIONS FOR SPECIALTIES

# Driving Innovation Through AI and Next-Generation Products

Wednesday, February 19 | 2:00pm -2:30pm

# Meet Our Speaker

**Jessie Walters**
Global Procurement Director
**Evonik**


SOCMA Show
Adapting Supply Chains for a Changing World

# Driving Innovation Through AI and Next Generation Products

SOCMA Show, Nashville TN
Adapting Supply Chains for a Changing World

February 19, 2025 | Jessie Walters | Evonik Corporation

EVONIK
Leading Beyond Chemistry

# Evonik at a glance

## Global large cap chemical manufacturer with focus on innovation and sustainability

**€15.3 bn**
Sales

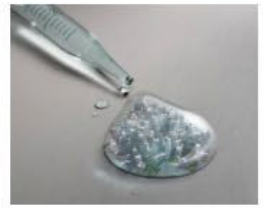
**€1.7 bn** (10.8%)
Adj. EBITDA (margin)

**€801 m** (48%)
Free Cashflow (conversion)

**€1.17** (>6%)
Dividend (yield)

**LEADING BEYOND CHEMISTRY**

**Specialty Additives**
Small amount – big effect



**Nutrition & Care**
Life at heart.
Systems in mind.
Partners at hand.

**Smart Materials**
We find solutions for the needs of today and tomorrow

***Differentiation via advanced technology, sustainable actions & customer-oriented solutions***

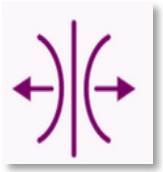


EVONIK Leading Beyond Chemistry

# Evonik's (Procurement) objective

## Execute strategies that flip the script – transforming VUCA challenges into wins

**Productivity** – Drive cost savings, improve resource allocation, and do more with less



**Resilience** - React with speed & agility to supply shocks or business demands

**Innovation** – Rapidly develop & source new and sustainable molecules & recipes; discover new ideas

**VOLATILITY** → **AGILITY**

**UNCERTAINTY** → **CLARITY**

**COMPLEXITY** → **EFFICIENCY**

**AMBIGUITY** → **PRECISION**

***Winners are determined by how skillfully they navigate and embrace change***



EVONIK Leading Beyond Chemistry

# Evonik's (Procurement) Objective

## Execute world class response to disruptions while proactively mitigating risk

### Reactive – Respond to Outage & Crisis

**Crisis Management** – Quickly react to supply chain issues, geopolitical issues, regulatory & tax changes etc by fast tracking high potential supply options

**Cost Innovation & Price Negotiation** – quickly identify high potential for savings to respond to material cost increases or ways to reduce cost in an RFP

**Peak Shaving** – respond to short term demand spikes & business opportunities while deferring/ avoiding CAPEX until business case is secure

### Proactive – Build Resilience

**Business continuity** – Quickly identify solutions that could be ramped up to reassure key customers & prepare for outages & supply shocks

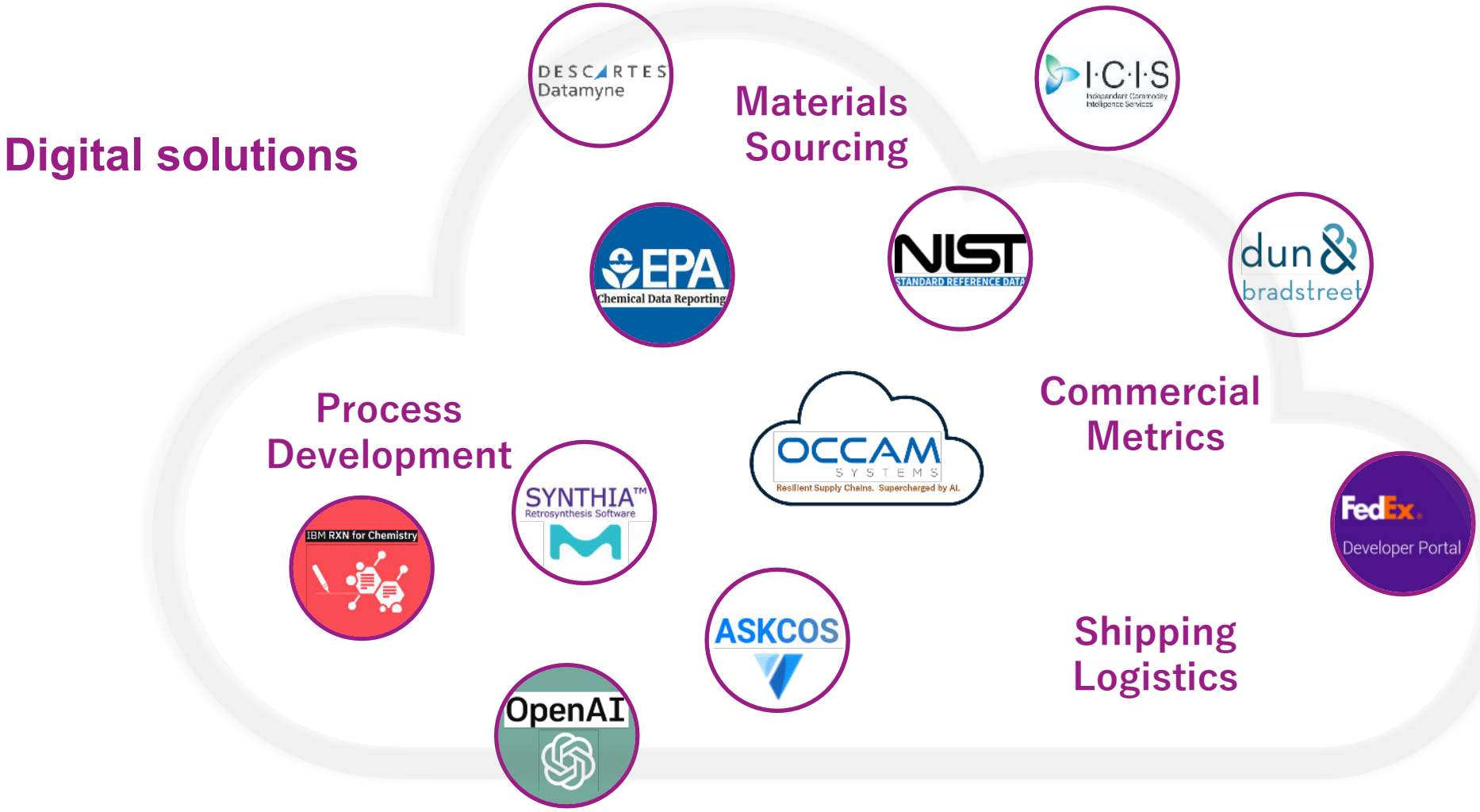
**Innovation Speed & IP protection** – Evaluate more pathways with real time data & save time. Build IP protection for multiple processes/ molecules

**Strategic Sourcing exercises.** Explore long term cost & productivity savings by mapping & evaluating internal & external supply networks (i.e. On/off shoring)

***"Oh – and by the way – it needs to be in the cloud…"***

# Digital tools enhancing supply chains available in today's market

Lots of existing options, but little that weaves it all together for use in industry






EVONIK Leading Beyond Chemistry

# Automation Case Study: Human driven, enhanced by AI

## Identification of two targets with minimal information

***Target Molecule 1***

- Target price: $4.50/kg or lower
- Production volume: Approx. 1200mT/yr
- Delivery schedule: 2 major ~8-week campaigns per year; 515mT/each campaign); 10MT/month spread equally through yr
- Volume: 515 mT major campaign; 8-week (7 days/week operations) 10 mT monthly production; 4 weeks (7 days/week operation) Total: 1150 mT
- Product Form: Liquid
- Assay requirements: GC, KF, Comparator (color), Clarity; 98% (major); 0.5% (water); 0.3% BL19; 500 ppm (minor)
- Chemical Structure

***Target Molecule 2***

- Target price: $6-7/kg or lower
- Production volume: Approx. 500-700 mT/yr
- Delivery schedule: 4 campaigns spread equally through yr
- Volume: 500 mT total; 125 mT per campaign; 3 months (7-day week operation); 700 mT
- Product Form: Liquid, in totes
- Assay requirements: Purity: >85% (major), Water: < 0.5%; Color: <2 Gardner
- Chemical structure

# Automation Case Study: Human driven, enhanced by AI

## Process Development: Chemical Route Retrosynthetic Analysis

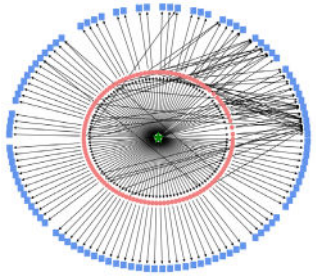
*AI Retrosynthesis* → *Down Selection*

Raw Materials Pricing
Literature Adjacency
Freedom to Operate

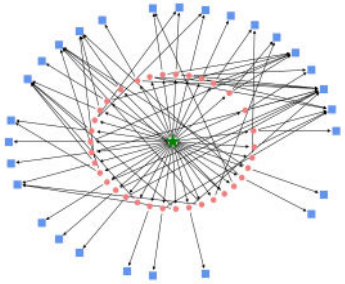
**Ranking Based on:**
Synthetic Complexity
Raw Materials Cost
Commercial Scale

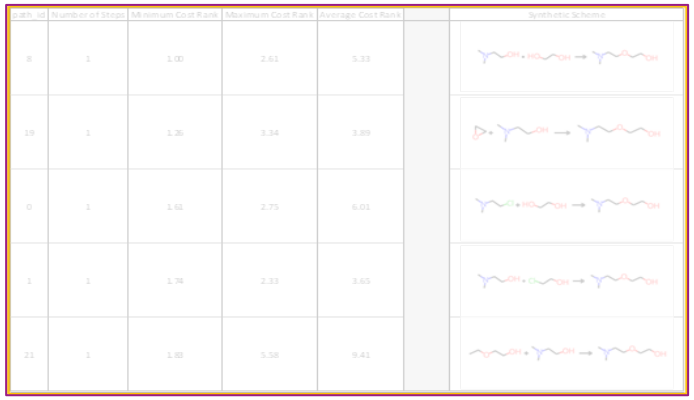
**Target 1**

600 Routes



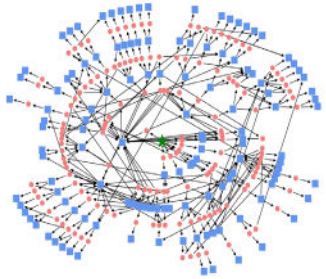
35 Routes



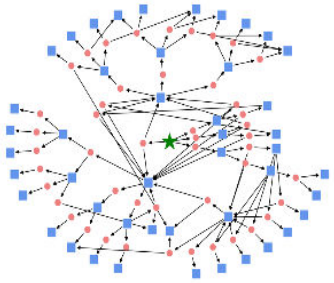


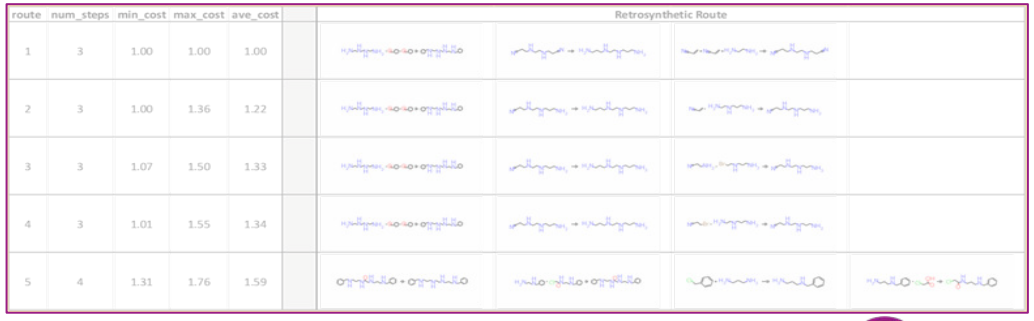
**Target 2**

1,841 Routes



36 Routes





# Automation Case Study: Human driven, enhanced by AI

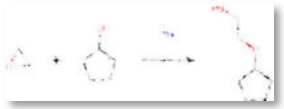
## Process Development: Recipe options, patent verification

Every reaction generated by **AI-retrosynthetic analysis** is screened against commercialized reactions

**For prior art, extract**:

- IP Reference (e.g. Target 1 Route 2: 56 patents)
- Status (10 active; 46 inactive)
- Reaction similarity score to target reaction

C1CX1OCXCCCC1>[XX]>OCCOXCCCX1



Recipe is automatically developed based on **customized criteria**

For each recipe, manufacturing cost of materials :

**Target 1**

| Path ID | Minimum Cost | Average Cost | Maximum Cost |
|---|---|---|---|
| 8 | $2.69 | $4.34 | $10.01 |
| 1 | $2.28 | $3.88 | $5.95 |
| 16 | $1.37 | $3.68 | $5.30 |

**Target 2**

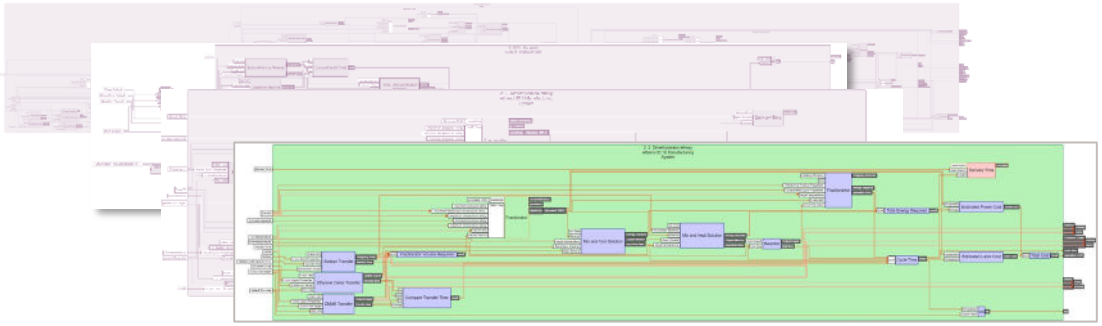
| Recipe | Minimum Cost | Average Cost | Maximum Cost |
|---|---|---|---|
| No Catalyst Recycle Cost | $6.52 | $6.86 | $8.02 |
| Discounting Catalyst Cost | $1.85 | $2.10 | $3.09 |

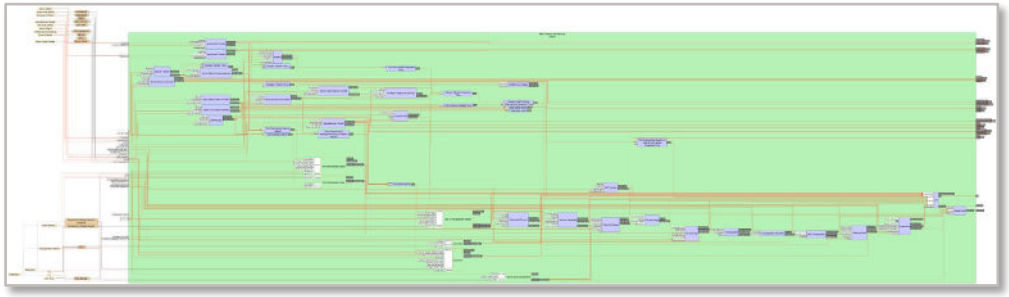
# Automation Case Study: Human driven, enhanced by AI

## Manufacturing Options: Identify asset options and candidate manufacturers

**Digital thread contains:**

- Candidate manufacturers within confidential asset database, customized based on Evonik supplier criteria
- Asset utilization, utilities cost, labor cost
- Process requirements for flexible production objectives
- Preferred supplier or internal asset gaps





| Candidate Manufacturers | Batch Size (MT) | VTO ($m^3.hr.kg^{-1}$) | Estimated Cycle Time (hr) | Estimated Operating Cost ($/kg) |
|---|---|---|---|---|
| XXX | 10 | 0.088 | 16 | 4.77 |
| | | 0.062 | 17 | 4.78 |
| | | 0.064 | 18 | 4.78 |
| YYY | 10 | 0.070 | 13 | 4.18 |
| | | 0.081 | 18 | 4.19 |
| ZZZ | 10 | 0.12 | 13 | 3.04 |
| | | 0.051 | 13 | 3.04 |

| Candidate Manufacturers | Batch Size (MT) | VTO ($m^3.hr.kg^{-1}$) | Estimated Cycle Time (hrs) | Estimated Operating Cost ($/kg) |
|---|---|---|---|---|
| AAA | 2 | 0.33 | 14 | 3.48 |
| BBB | 2 | 0.91 | 14 | 2.83 |
| CCC | 10 | 0.95 | 52 | 2.78 |

***Automation*** ***Candidate Manufacturers***

# Automation Case Study: Human driven, enhanced by AI

## Strategic Sourcing: Putting it all together, tailored to Evonik requirements

### Supply Chain Alternatives:

- Candidate supplier ranking
- Materials cost (substrates, reagents, solvents, catalyst)
- Automated compilation of technical package
- Supply chain map

**Candidate Suppliers**

| Supplier | Estimated Daily Revenue ($) |
|---|---|
| AAA | 42,000 |
| BBB | 41,000 |
| CCC | 12,000 |

| Molecules | Production required (mT/year) | "Should-Cost" Goal | Synthetic Routes Identified | Number of Identified Domestic Suppliers | Candidate Domestic Suppliers Identified | Route Candidate Cost of Goods Sold ($/kg) [Substrates, Reagents, Solvents, Catalyst] | |
|---|---|---|---|---|---|---|---|
| | | | | | | Min | Max |
| Target 1 | 1200 | $4.5/kg | 600>>31>>21>>4 | 3 | Recipe 1: XXX, YYY, ZZZZ | $2.28 | $5.95 |
| | | | | 3 | Recipe 2: XXX, YYY, ZZZZ | $2.69 | $10.01 |
| | | | | 3 | Recipe 3: AAA, BBB, CCC | $1.37 | $5.30 |
| | | | | 1 | Recipe 4 (Legacy): CCC | $3.18 | $4.35 |
| Target 2 | 500-700 | $6-7/kg | 1841>>36>>5>>1 | 3 | AAA, BBB, CCC | $1.85 | $3.89 |

Technical Package

Supply Chain Map

# Reactive and proactive VUCA risk mitigations are enhanced by AI

## Automation increases robustness and speed in R&D, scale up and sourcing

| Benefits & Enhancements |
| --- |
| Portfolio management, production scenario analysis (internal or external) |
| Rapid analysis of alternative chemistries and raw materials to assess potential and achieve cost and sustainability goals |
| Freedom to operate analysis, IP strategy development |
| Recipe development acceleration, process alternative identification |
| Manufacturing equipment options via integrated process simulations |
| Rapid and robust sourcing support via tech package development, should cost analysis, capacity utilization assessment and supply chain ranking tailored to customer needs |
| Platform can support full supply chain analysis, or only part – depending on objective |

***Speed on the order of days and weeks vs months and years***

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# What's Next

- **Navigating Policy Changes: Impacts on the Specialty Chemical Sector**
  - 3:00pm – 4:00pm
- **Grand Opening Reception**
  - 4:30pm – 5:30pm

NATION FORD CHEMICAL
America's Leader in Custom Manufacturing