

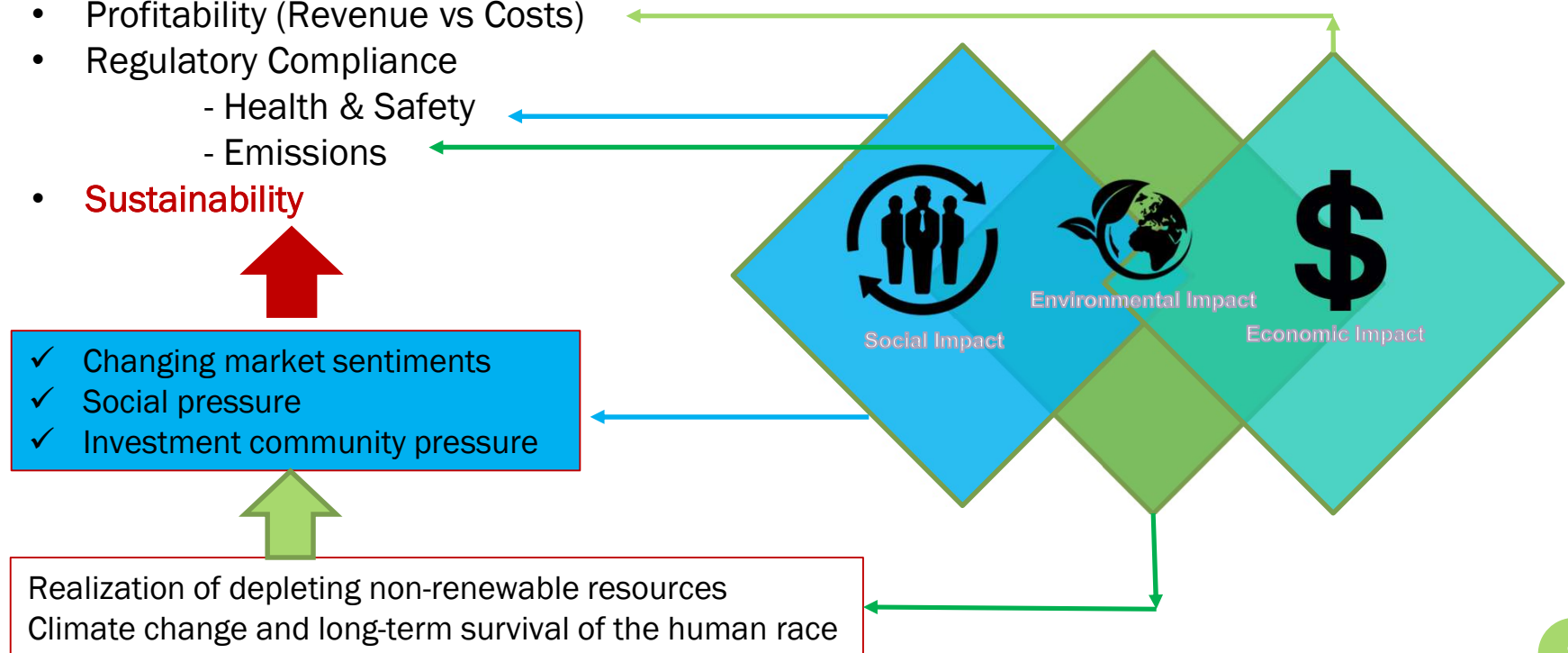


## **BUILDING A ROADMAP TO ACHIEVE SUSTAINABILITY THROUGH DIGITALIZATION**

# Modification to Success and Growth Measures for Process Manufacturing Enterprises

Sustainability is fast becoming a key parameter to be considered, along with the traditional metrics

- Profitability (Revenue vs Costs)
- Regulatory Compliance
  - Health & Safety
  - Emissions
- **Sustainability**



## Sustainability Avenues

Several avenues to drive building a sustainable operations model

- Renewable resources (Green Hydrogen, Biofuels, Biofeeds,.....)
- Recycling
  - External product recycling
  - Internal → waste reduction
- Reduction in specific resource consumption
  - Waste reduction
  - Reduce leaks, emissions and flaring
  - Improved product recovery
  - Improved yields (feed efficiency)
  - Improved Water & Energy efficiency



Decarbonization  
Net Zero Carbon  
Carbon Neutral



Process  
Technologies

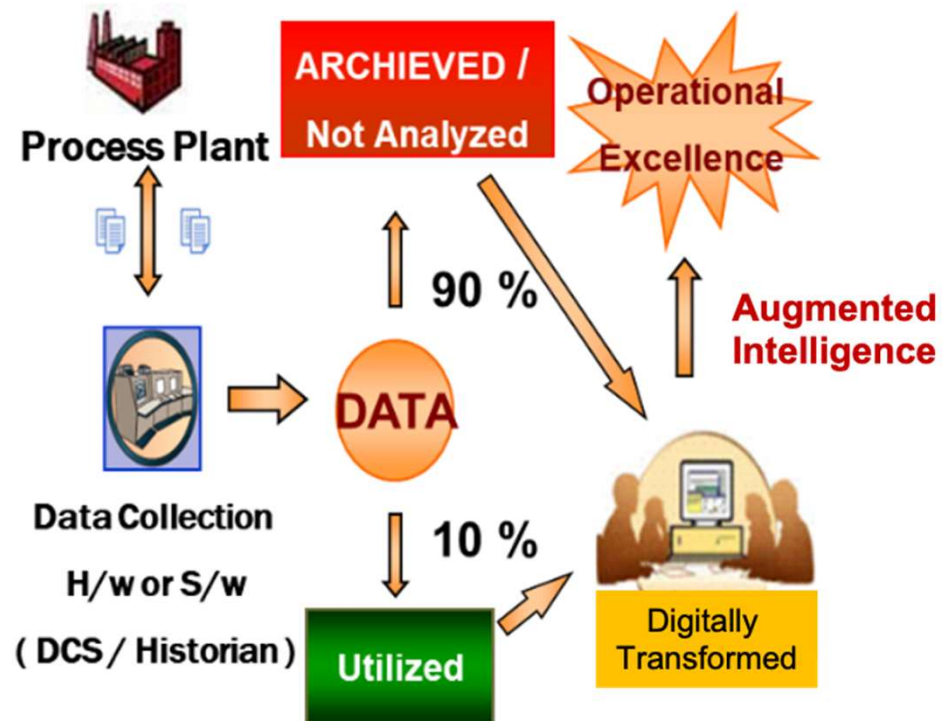
Innovative  
Engineering Design

Operations Performance  
Improvement

## Leverage Digitalization For Sustainability in conjunction with traditional business needs

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Excellence Through Insight

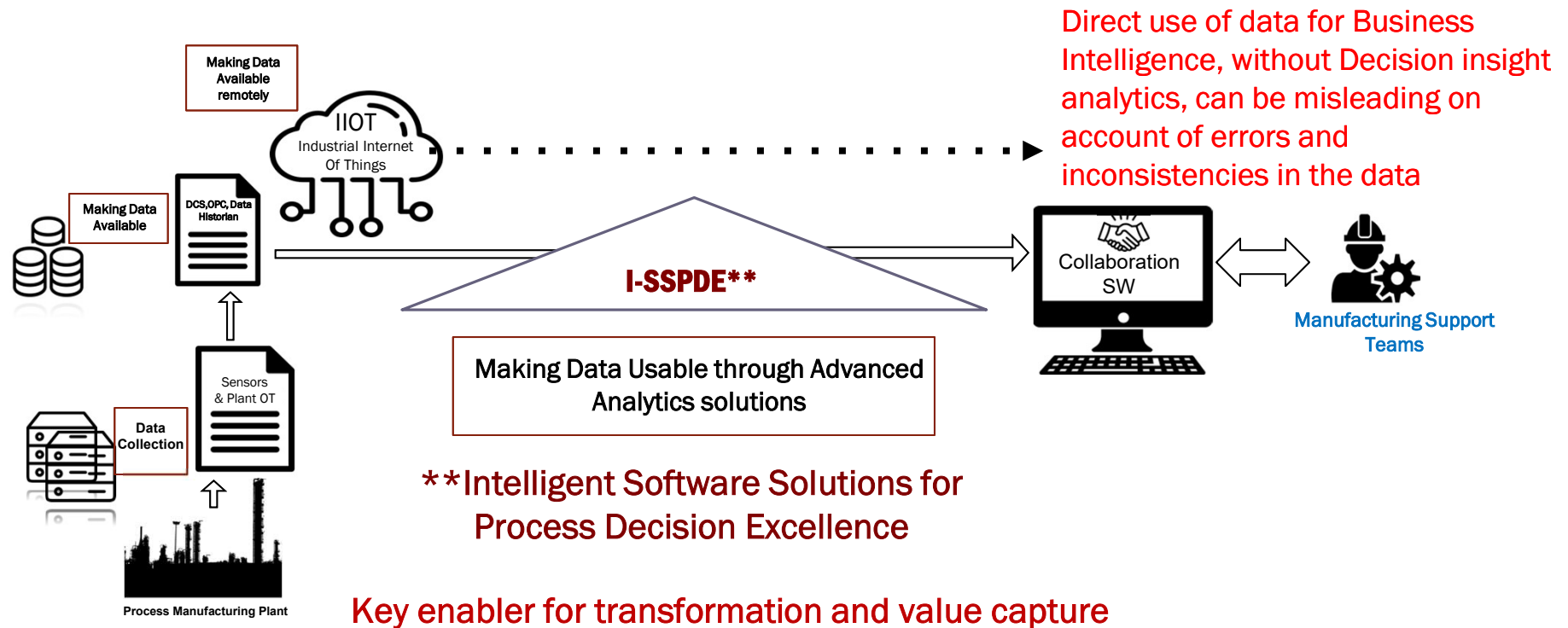
Effective Digital Transformation, utilizes Digital technologies to convert Data to **Augmented Intelligence** that enables closer to real time access to decision quality information. This greatly facilitates achievement of improvements in existing manufacturing units for greater Sustainability, while not losing sight of traditional business values.



# Key To Digitalization For Process Manufacturing

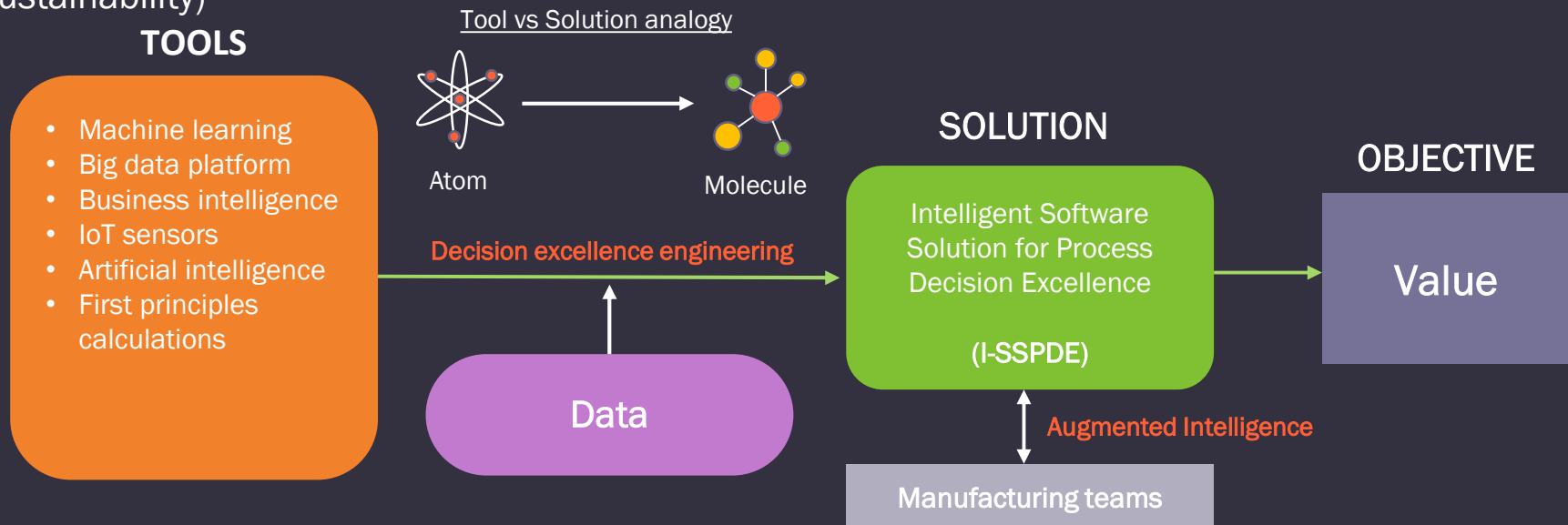
Digitally connected Advanced Data Analytics solutions that enables making data useful, is an essential piece to achieve Digitalization goals in Process Manufacturing

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## Key Learning – Significance Of Decision Engineering

The key is to understand and customize the right technology to answer the questions and provide the insight to achieve the specified operational goals (Profitability, Safety, Effectiveness, Sustainability)



Decision excellence engineering necessary for a successful Digitalization implementation



# I-SSPDE Capabilities

I-SSPDE has a multitude of capabilities that empower digital transformation



**Actionable Intelligence**  
Smart analytical engine



**Hybrid Model  
Digital Twin**  
AI/ML + 1<sup>st</sup> Principle



**Data Historian Agnostic**  
Wide compatibility



**Smart Dashboards**  
Interactive levels



**Financial Optimizer**  
Cost savings analysis



**False Positive Resistant**  
Real and accurate



**Real-time**  
Live data solutions



**Multi-dimensional**  
Covers wide spectrum



**Soft sensors**  
Address drift/anomalies

# CASE EXAMPLES

of how Digital solutions have been used through Innovative Design  
Engineering and Operations Performance Improvement to enhance  
Sustainability parameters



## Heat Integration Benefits for a Mumbai Refinery



Digital Twin for  
Pre-Heat Train



Heat  
Integration



**9%**

increase in  
Desalter temperature

**13%**

reduction in  
CDU heater duty

**40%**

higher pre-flash  
vapour drum flow

Significant Energy Savings with no capex → Reduced Carbon Footprint

## Steam Management for a US Specialty Chemicals



Digital Twin for  
complex-wide  
Steam Network



Steam  
Management



**3%**

lower MP steam  
consumption

**28%**

lower LP steam  
consumption

**48%**

lower LLP steam  
consumption

**14MW Energy (exchanger duty) savings identified**

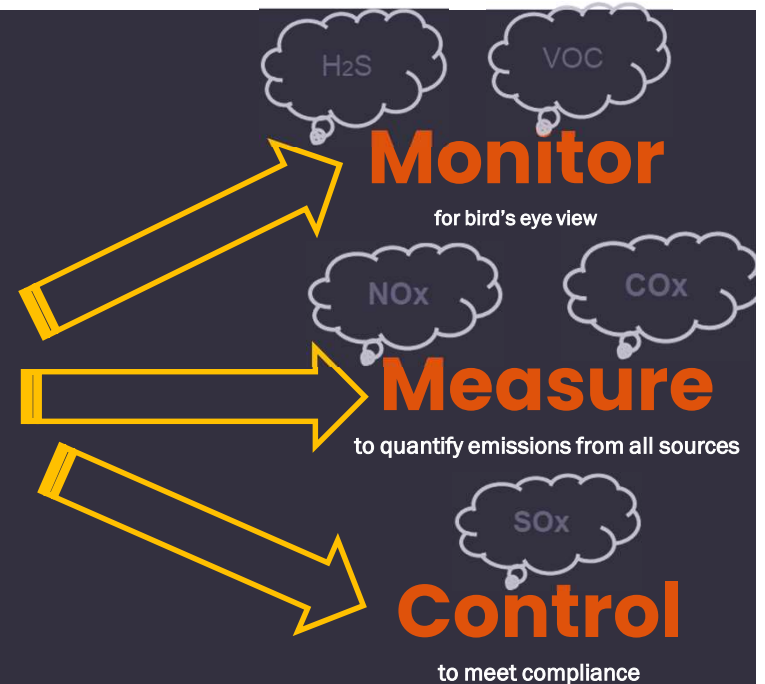
# Digital Twin for Emissions Management

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**FLAME™**  
Software Solution  
(Flare Gas Estimation  
and Emission  
Quantification)

enables the clients to achieve the requirements of regulatory compliances by estimating flare study & emissions from all the sources.



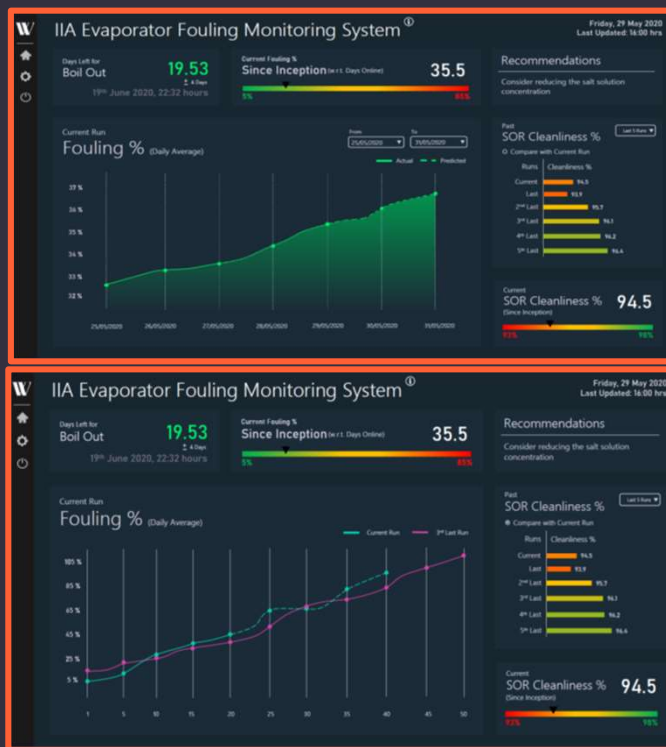
A way to track improvements and identify scope for carbon trading opportunities

# Anomaly Detection and Improvement



## Augmented Intelligence

can help operate evaporators consistently above their design capacities, making continuous improvements to operate closer to theoretical best



**Predicted**  
Run-Length

**Benchmarking**  
with on-going status

**Effectiveness**  
of boil out process

**Smart**  
Recommendations

Finding “PROBLEMS” before they find “YOU”

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**43,712,570**

Data points  
analyzed  
daily



**2,862,501**

Process  
engineering  
man-hours



**61,886**

Relief  
devices  
handled



**1,485**

Process  
Studies  
conducted



**20**

Global  
Programs  
Implemented