

Unlocking the Power of Data: Transforming Supply Chain Performance

LUNCH AND LEARN

Thursday, December 5, 2024 | 12pm ET



Featuring
Melody Shellman

About our Related Course Series

scl.gatech.edu/SCA



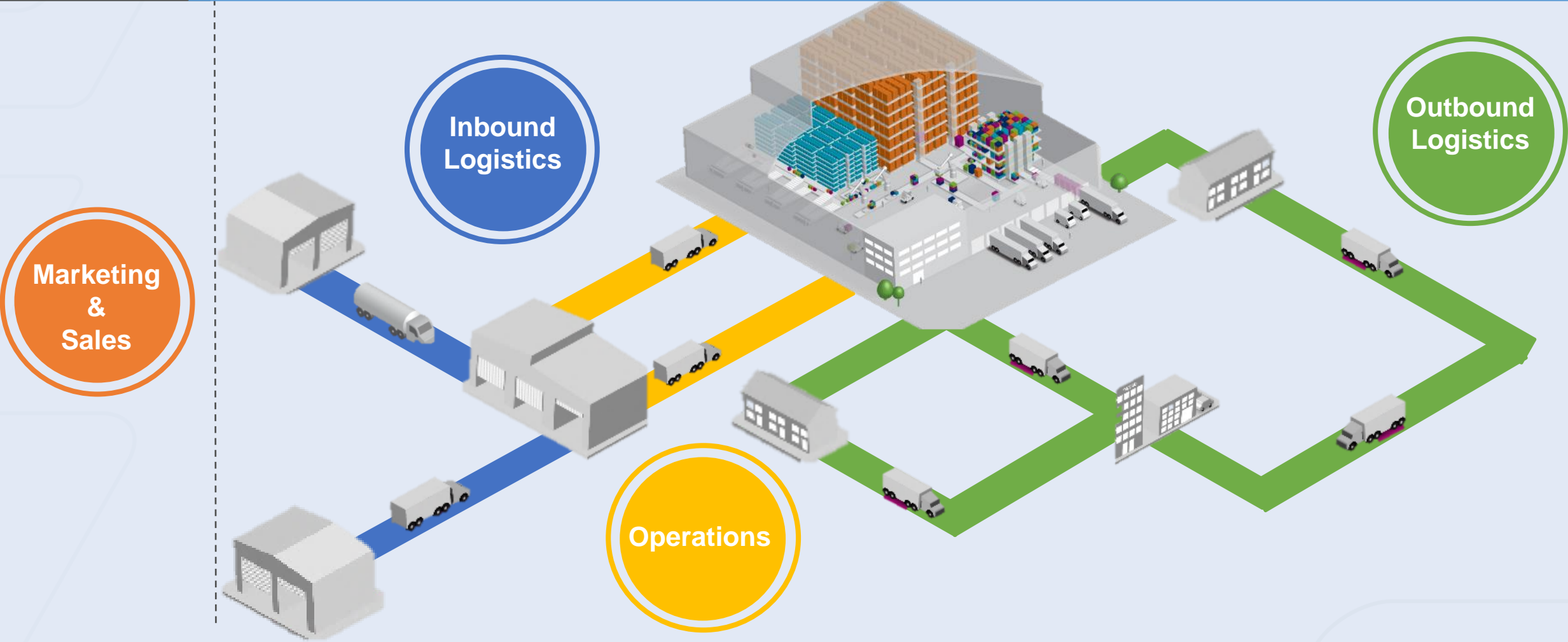
Supply Chain and
Logistics Institute

Thank you for attending!

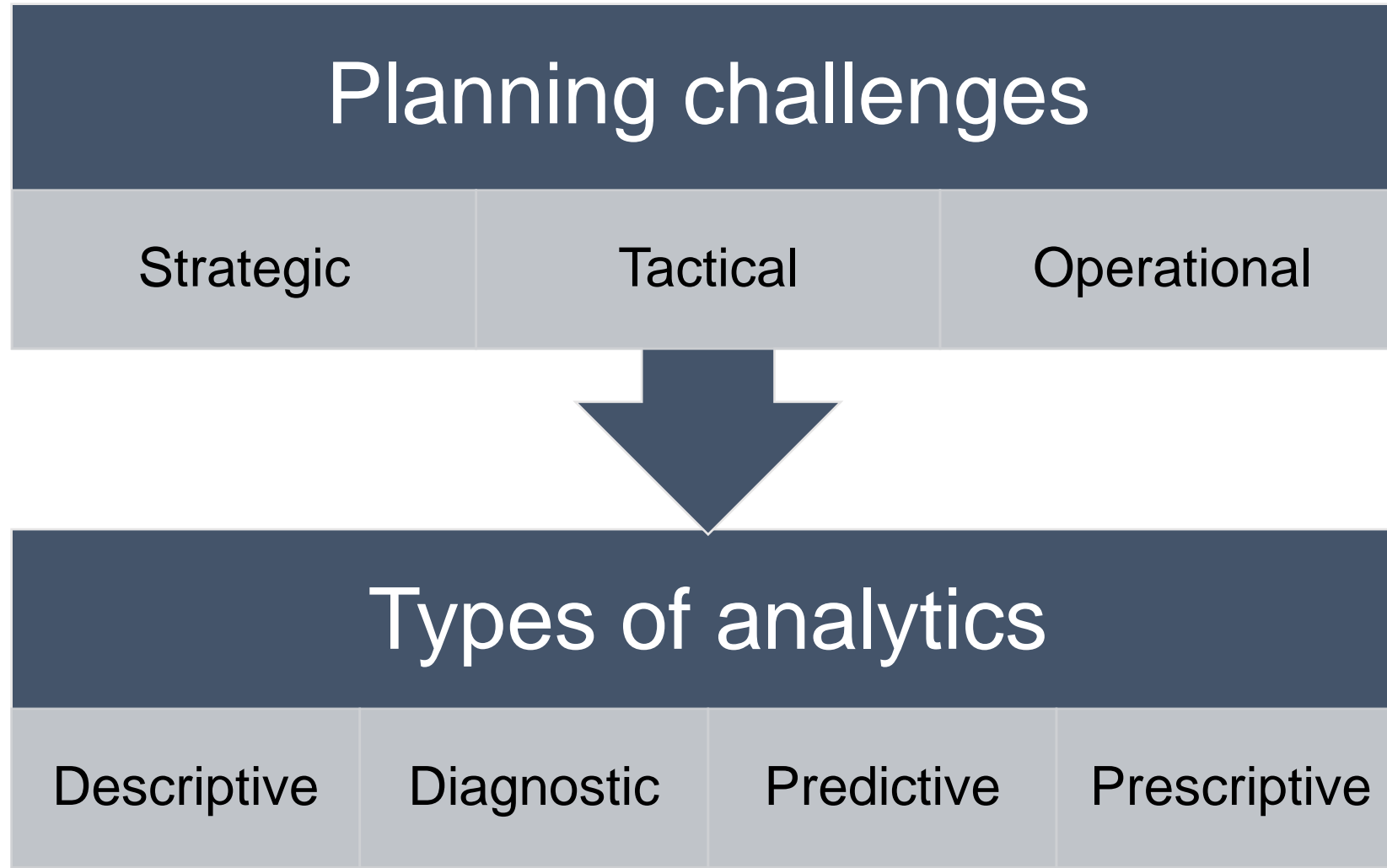
Supply chain process

Demand Creation

Demand Fulfillment



Overview of analytics transforming SCM



Planning Challenges

Marketing & Sales

Inbound Logistics

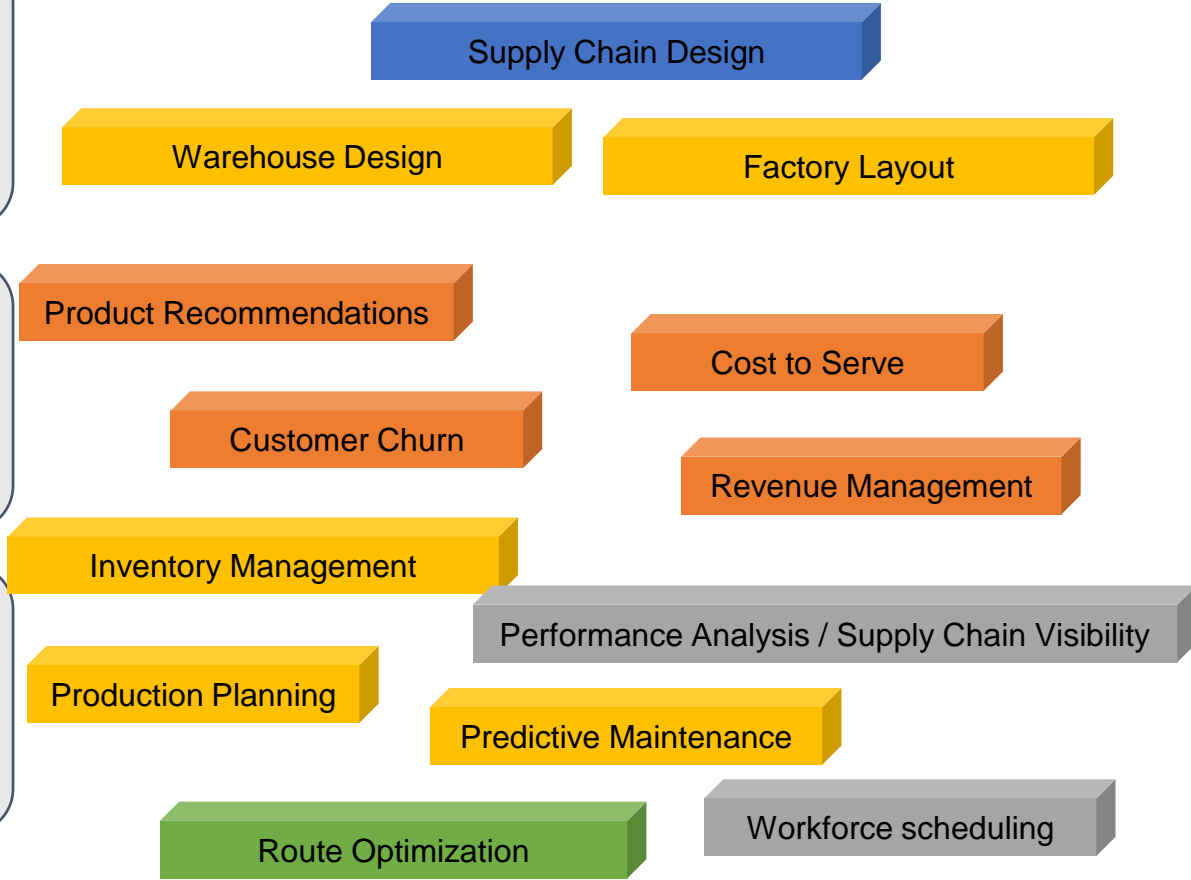
Operations

Outbound Logistics

Strategy
meet long-term goals

Tactics
Policies and procedures to support the strategy (mid-term)

Operations
Carrying out the policies and procedures that support the strategy (short-term)



Supply chain challenges

Challenge 1

Marketing & Sales

Cost to Serve

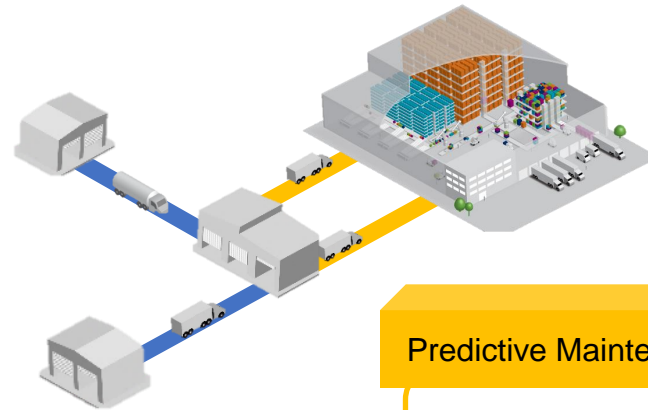
Which customers are actually costing me money?

How profitable are my individual customers?

Challenge 2

Inbound Logistics

Operations



Predictive Maintenance

When to perform maintenance tasks?

Challenge 3

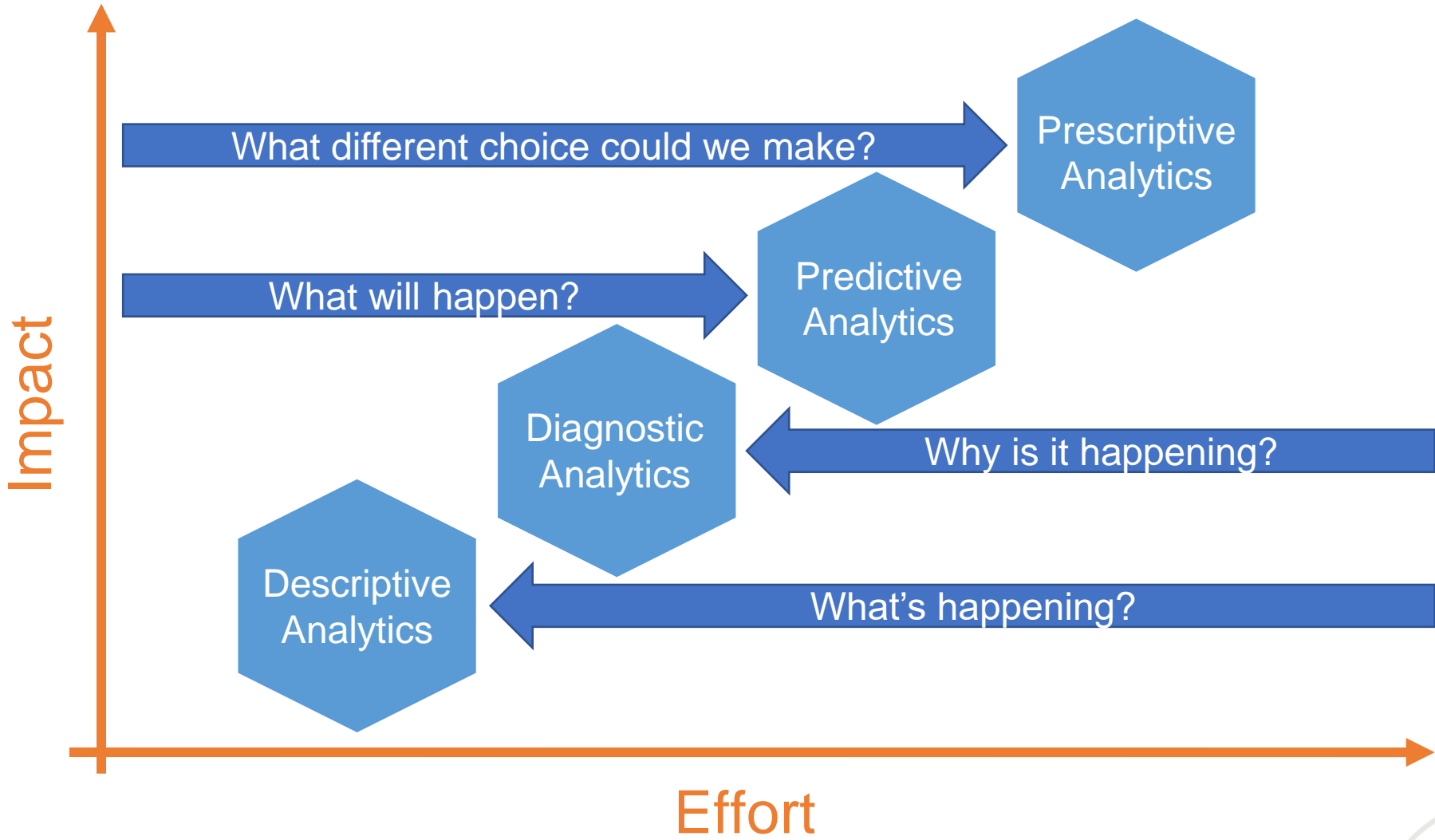
Outbound Logistics



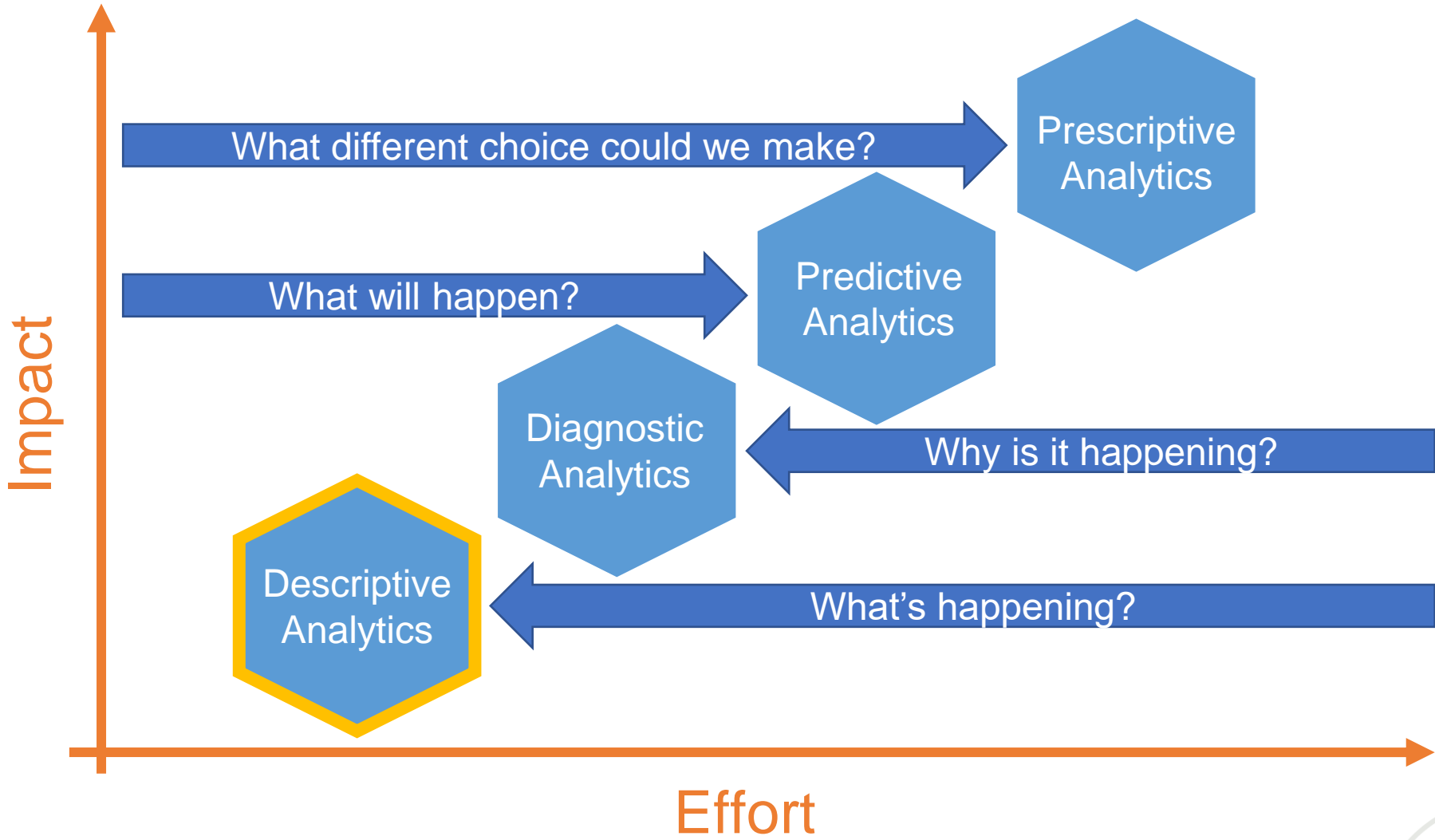
Route Optimization

How should I route my trucks?

Analytics Continuum

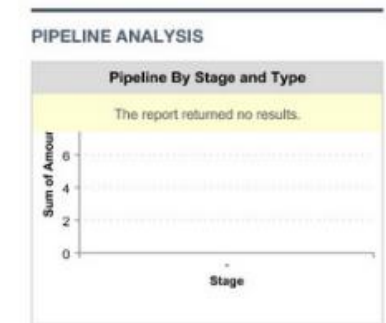
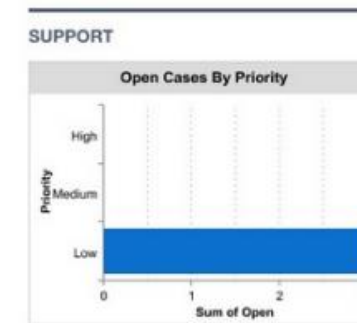


Analytics Continuum



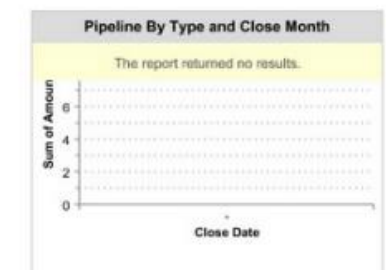
What is descriptive analytics?

- Answers: what happened?
- Based on historical data
- Helps user understand the business
- Often called Business Intelligence
- Included in many dashboards



Key Accounts

Account Name	Sum of Amount
United Oil & Gas Corp.	€3.4M
Grand Hotels & Resor...	€915K
Express Logistics...	€420K
University of Arizona	€240K
Burlington Textiles Co...	€235K



Analytics in SCM

Cost to Serve

- Supplier costs
- Production costs
- Inventory / warehouse costs
- Route costs

Maintenance

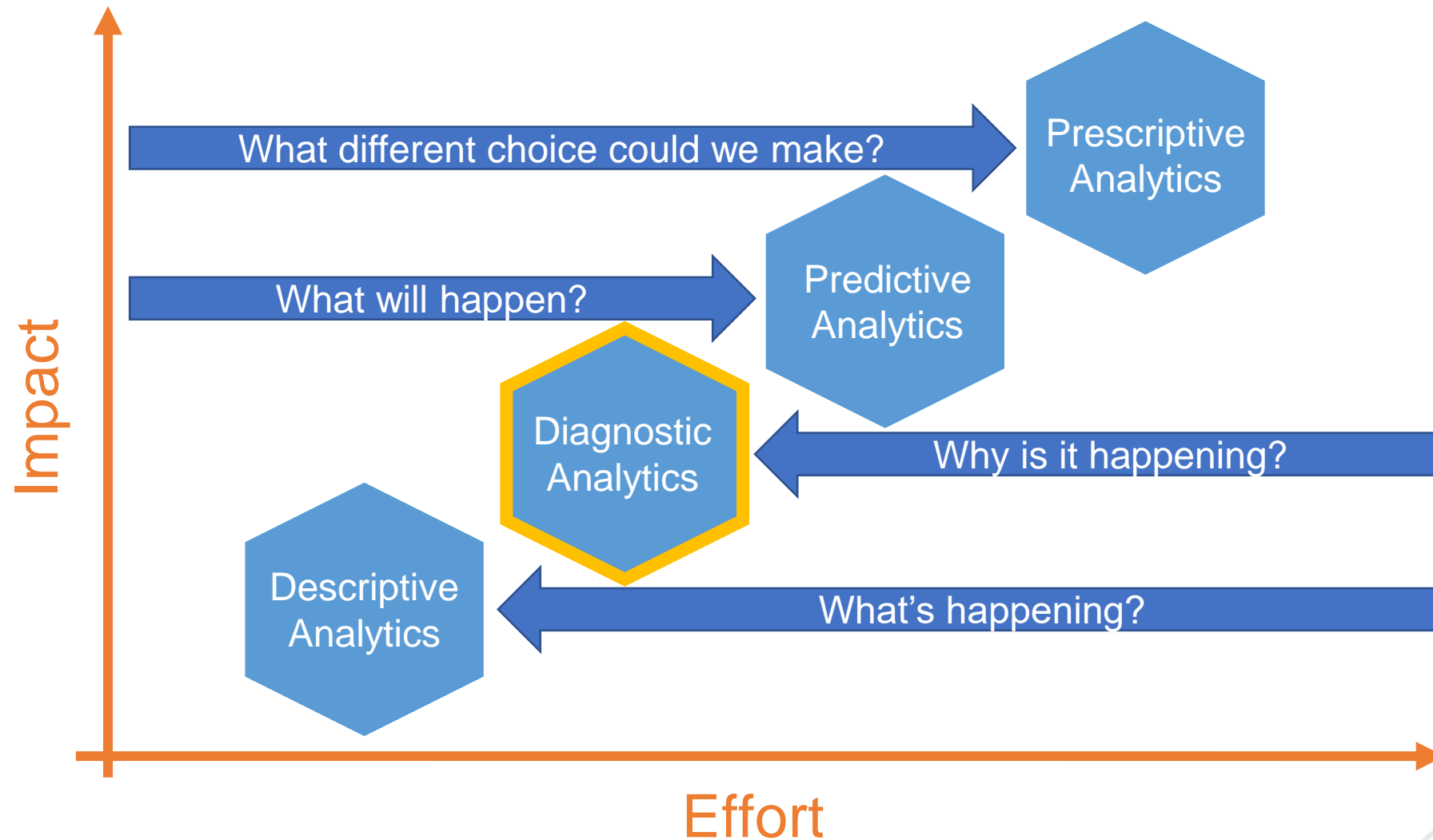
- Maintenance tasks being performed
- Equipment types requiring maintenance
- Downtime / costs

Routing / Last Mile

- Route distance, volume, costs
- Warehouse pickups, volume
- Customer deliveries, volume, on time
- Resource usage, utilization

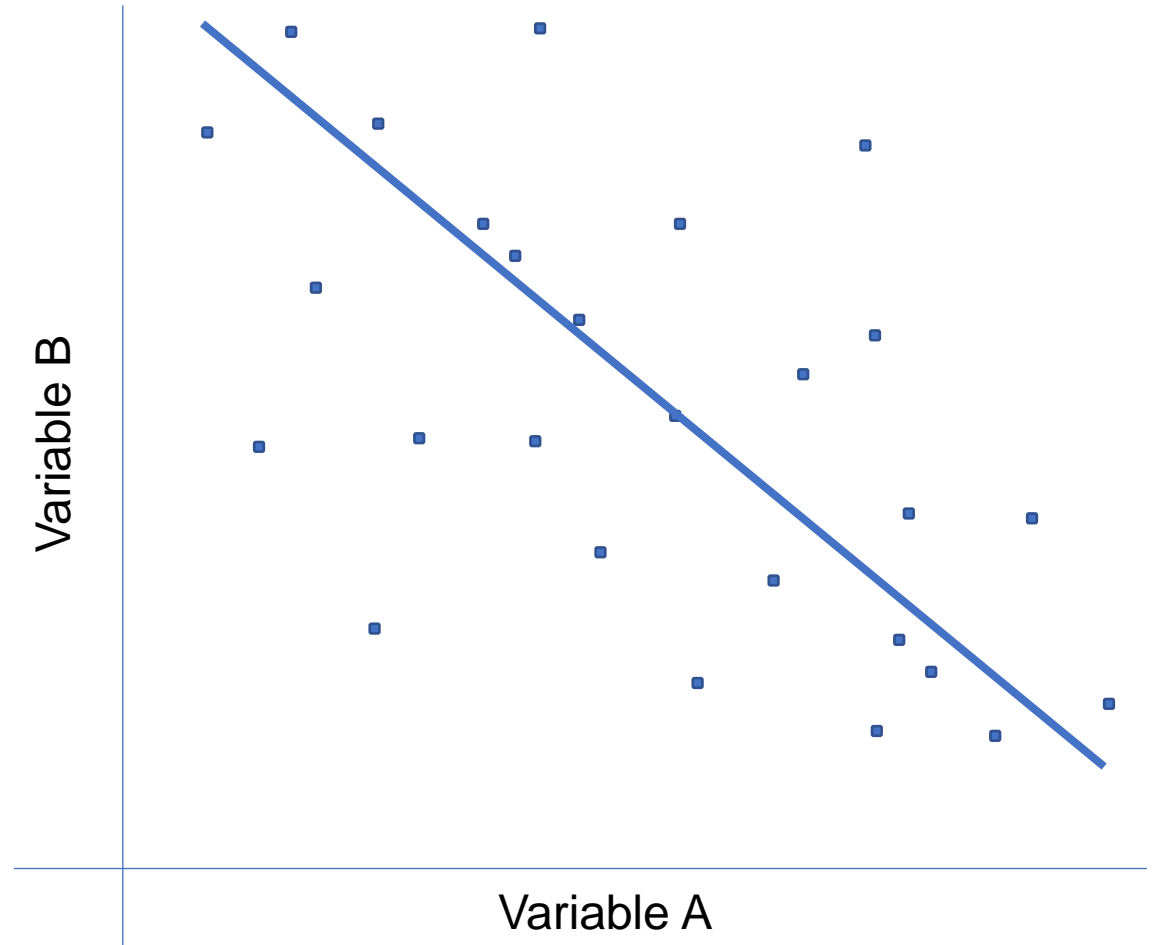
Descriptive

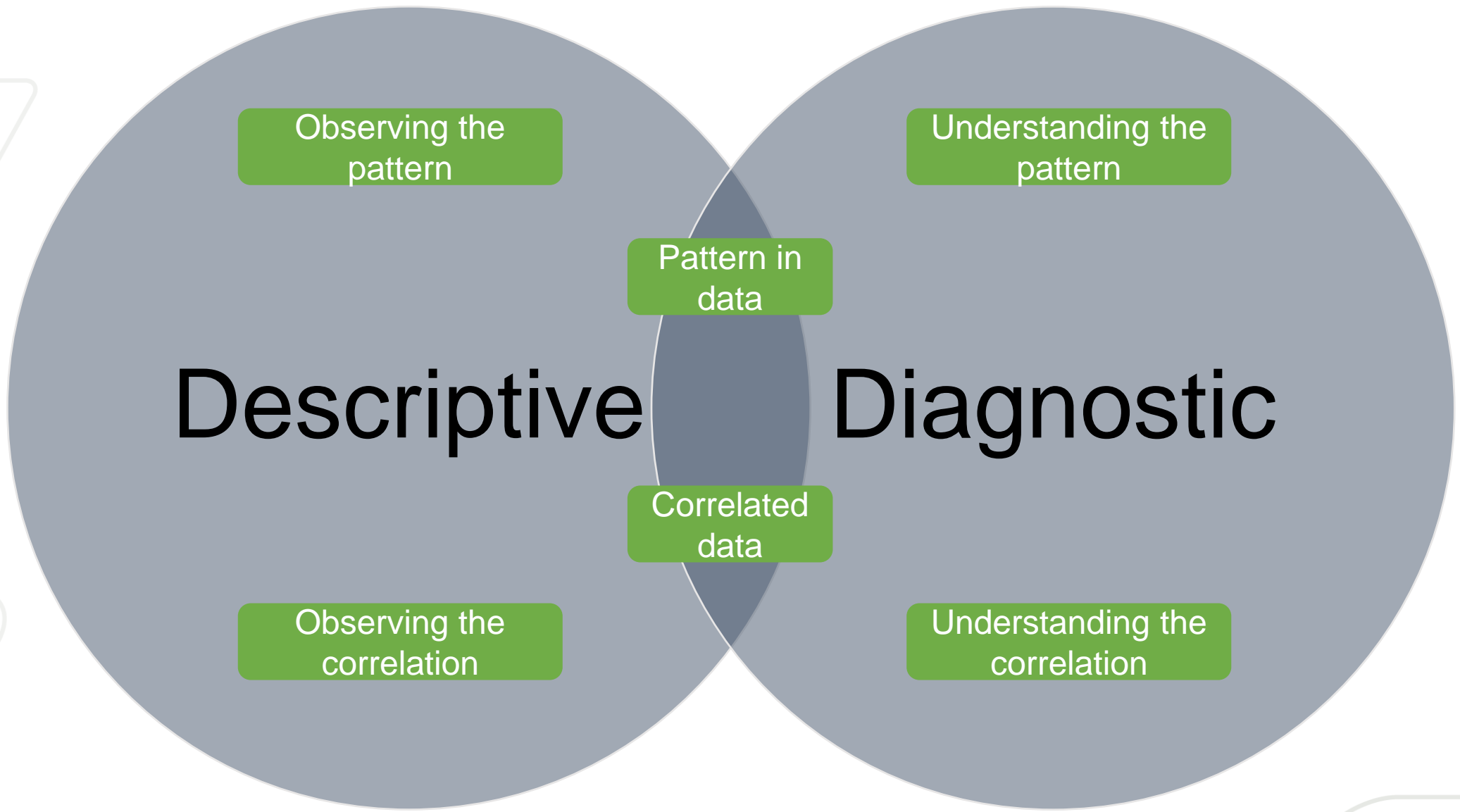
Analytics Continuum



What is diagnostic analytics?

- Answers: why did things happen?
- Based on historical data
- Helps user understand forces acting on the business
- Also often called Business Intelligence
- Included in many dashboards





Descriptive

Diagnostic

Observing the pattern

Understanding the pattern

Pattern in data

Correlated data

Observing the correlation

Understanding the correlation

Analytics in SCM

Cost to Serve

Maintenance

Routing

Descriptive

- Supplier costs
- Production costs
- Inventory / warehouse costs
- Route costs

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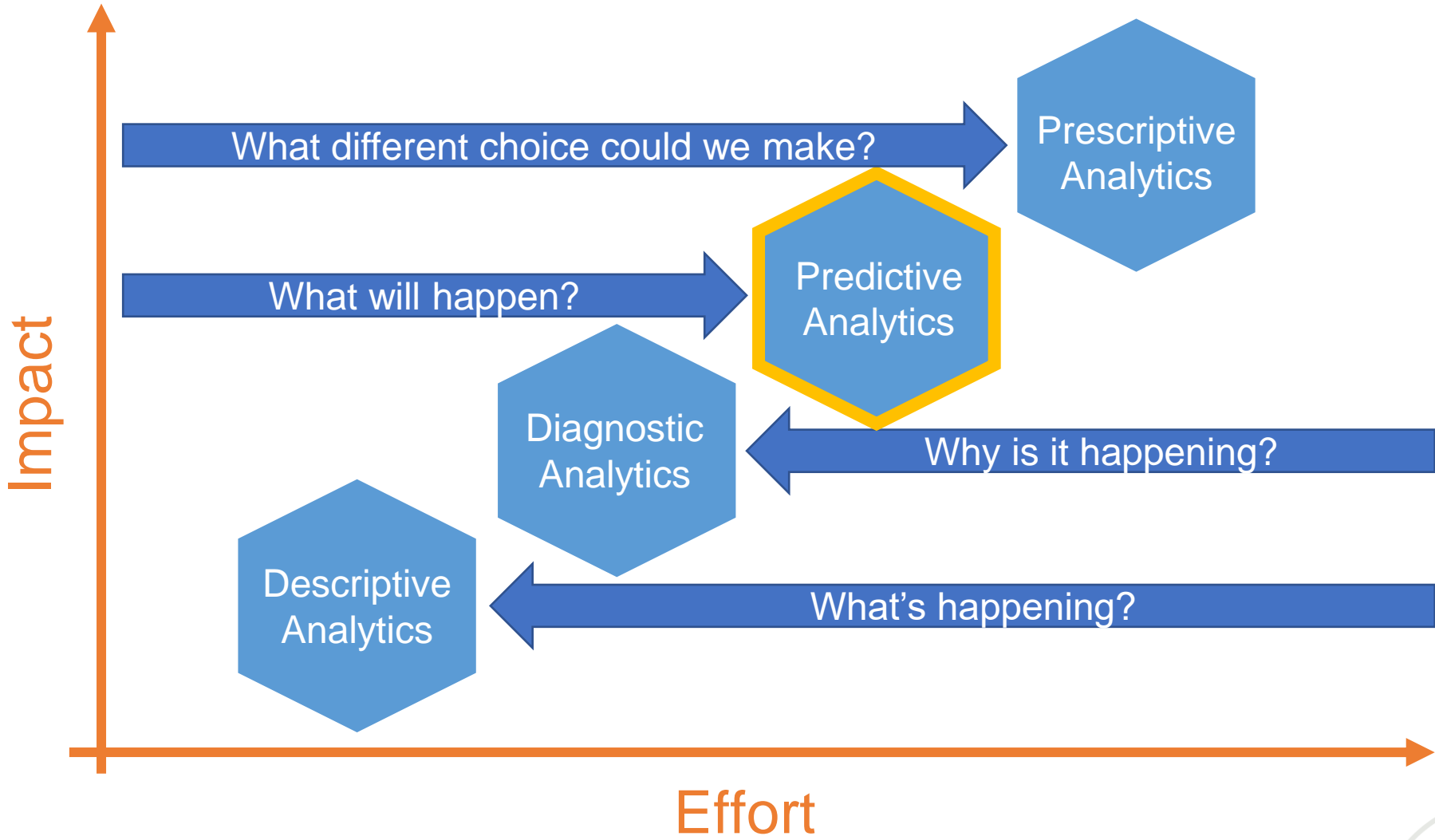
Diagnostic

- Production costs vs volume and product type
- Inventory costs vs demand, volume
- Route costs vs distance, duration, volume

- Equipment failures in relation to running times
- Equipment failures in relation to machine settings

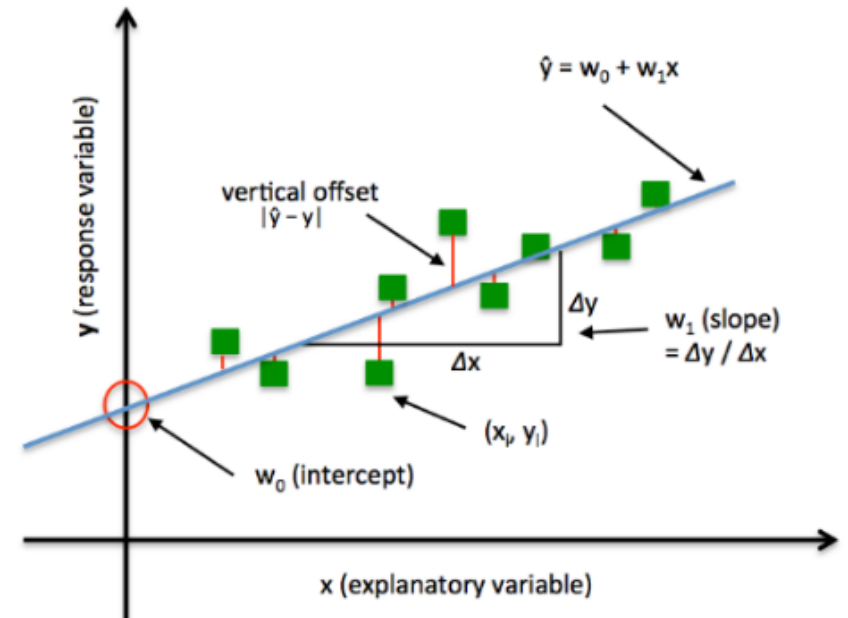
- Distance vs volume vs costs
- On time, planned vs actuals
- Utilization vs volume, truck type and product type

Analytics Continuum



What is predictive analytics?

- Answers: what will happen?
- Know what the future might bring
- Predictive modeling (“Machine Learning”)
- Simulation



Analytics in SCM

Cost to Serve

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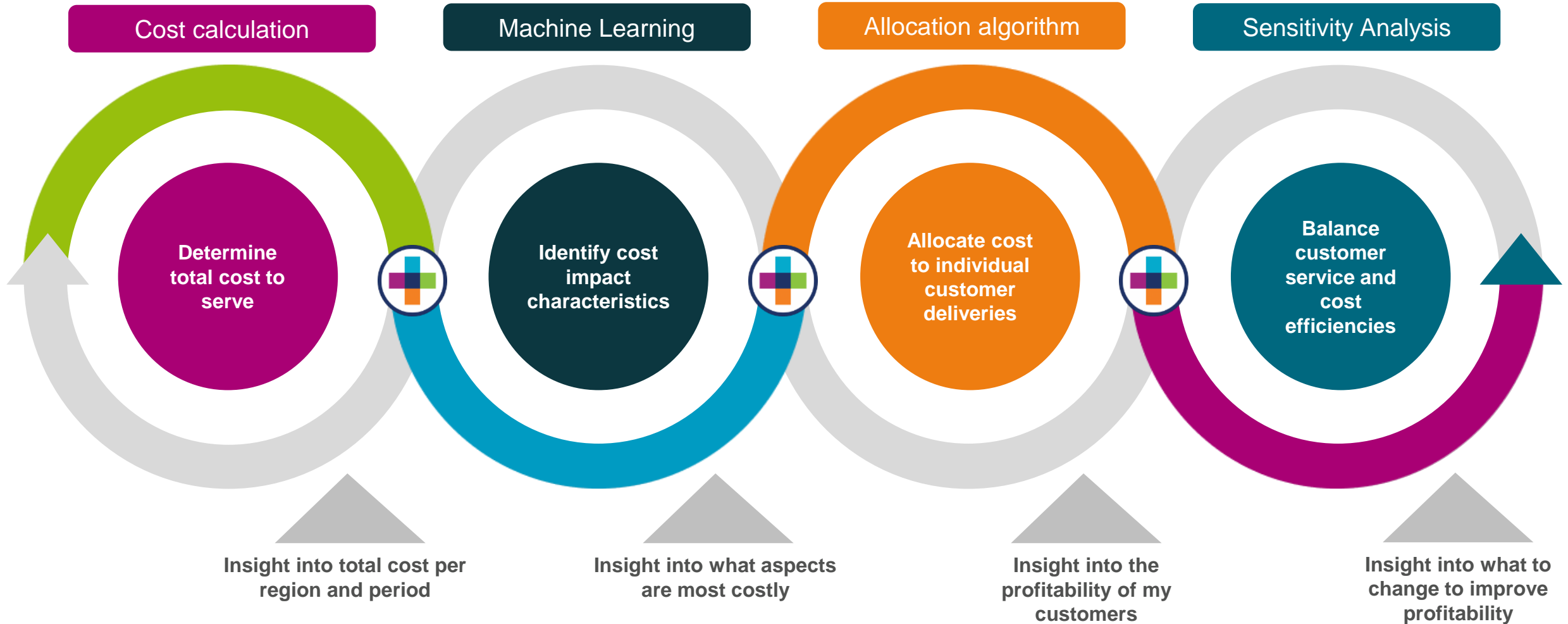
Predictive

- Predict impact of individual characteristics to costs
- Predict expected future costs

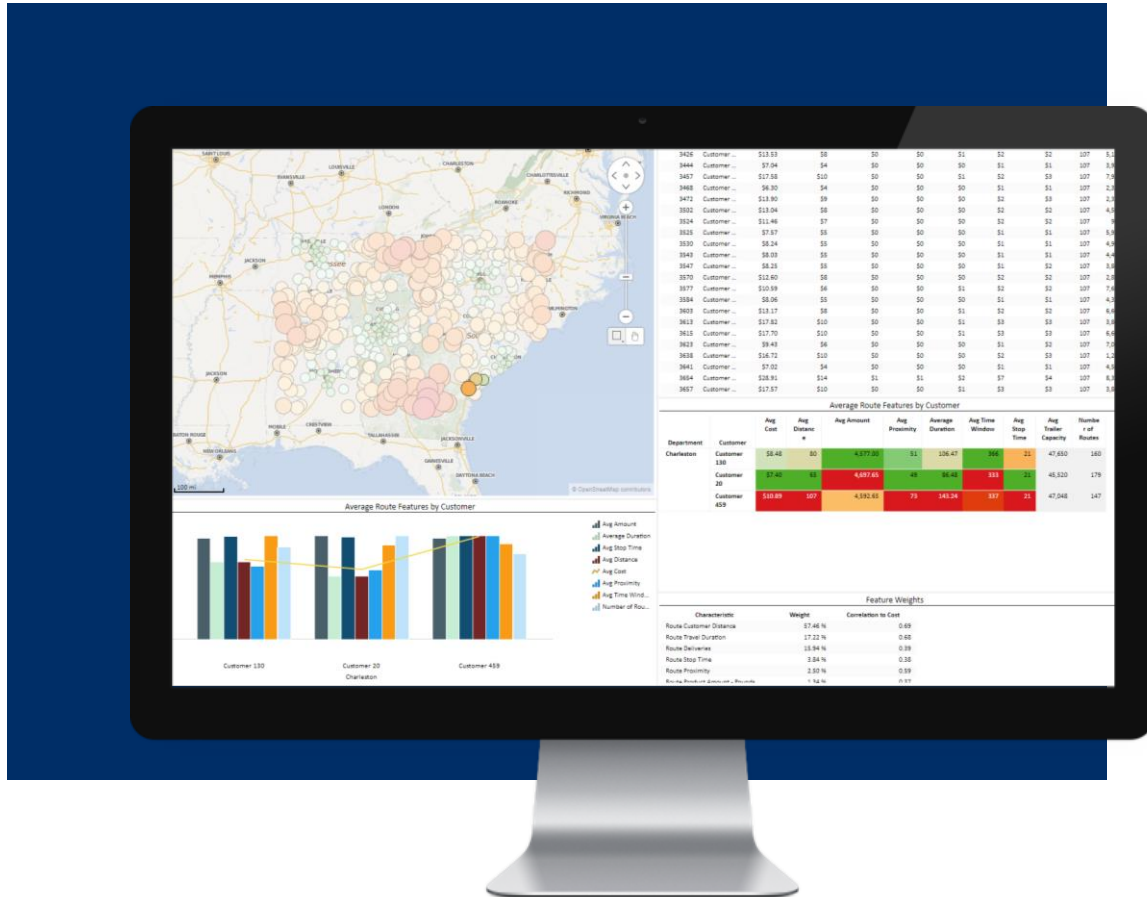
- When do we expect equipment failures
- What type of equipment failures to expect
- What is the expected time between equipment failures

- Predict future demand based on historic demand
- Predict stop time duration based on planned vs actuals

Project stages, each adding value separately and combined

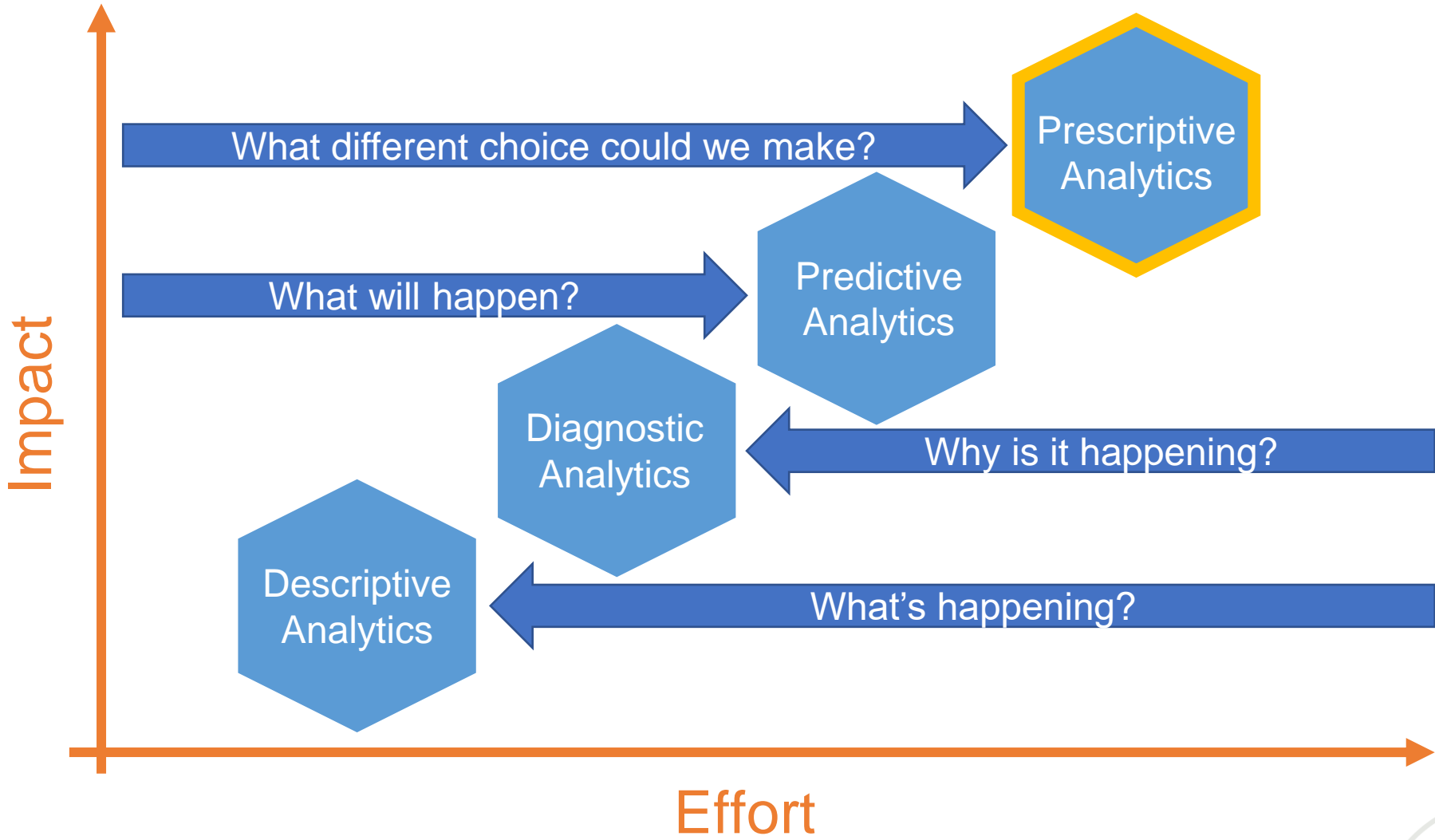


Cost-to-Serve : The Benefits



- Allows evaluation of the cost of individual deliveries
- Delivers data to support:
 - Reducing # visits per customer
 - Negotiating larger service windows
 - Reassigning customers to different depots
 - Increasing sales footprint in customer region
 - Installing minimum order values
- "We've seen utilization and gallons per truck per day go up. What has been a time consuming analysis, we can now do in real time with the Cost to Serve solution" - Cost to Serve Customer
 - 1M+ saved by the above customer!

Analytics Continuum



What is prescriptive analytics?

- Answers: What different choice could we make?
- Historic data input and / or predictions input
- Optimization models
- Reinforcement learning agents

Analytics in SCM

Cost to Serve

Maintenance

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- Distance vs volume vs costs
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Predictive

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Prescriptive

- Balance cost and customer service
- Determine right price

- Determine maintenance plan
- Scenario analysis for maintenance strategy

- Create optimal routes
- Create resource schedule
- Determine need for additional flex resources

Making decisions based on the forecasted outcomes

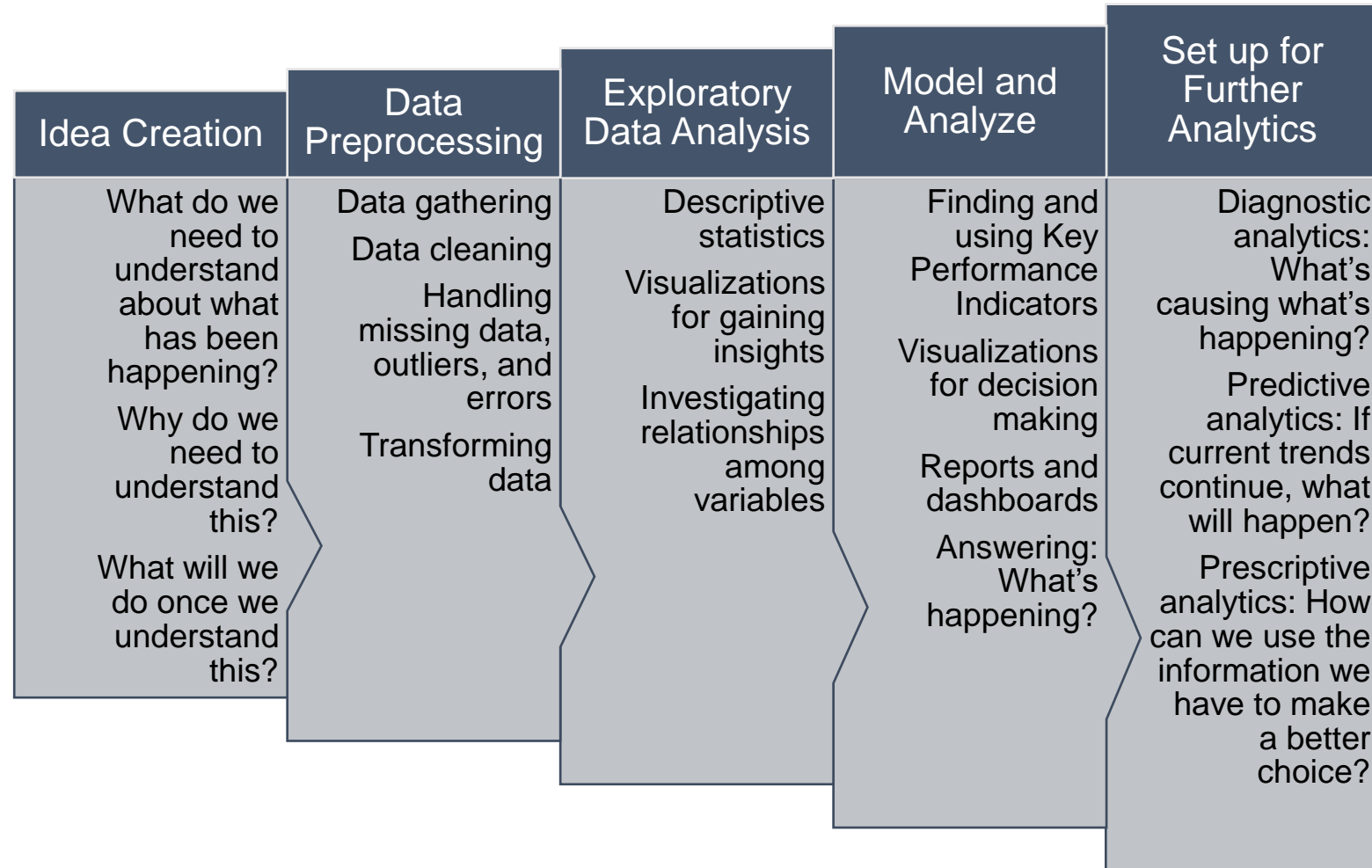
Making decisions to change the forecasted outcomes

Forecasting the future

Predictive

Prescriptive

A 5-Stage Conceptual Process for Analytics Projects

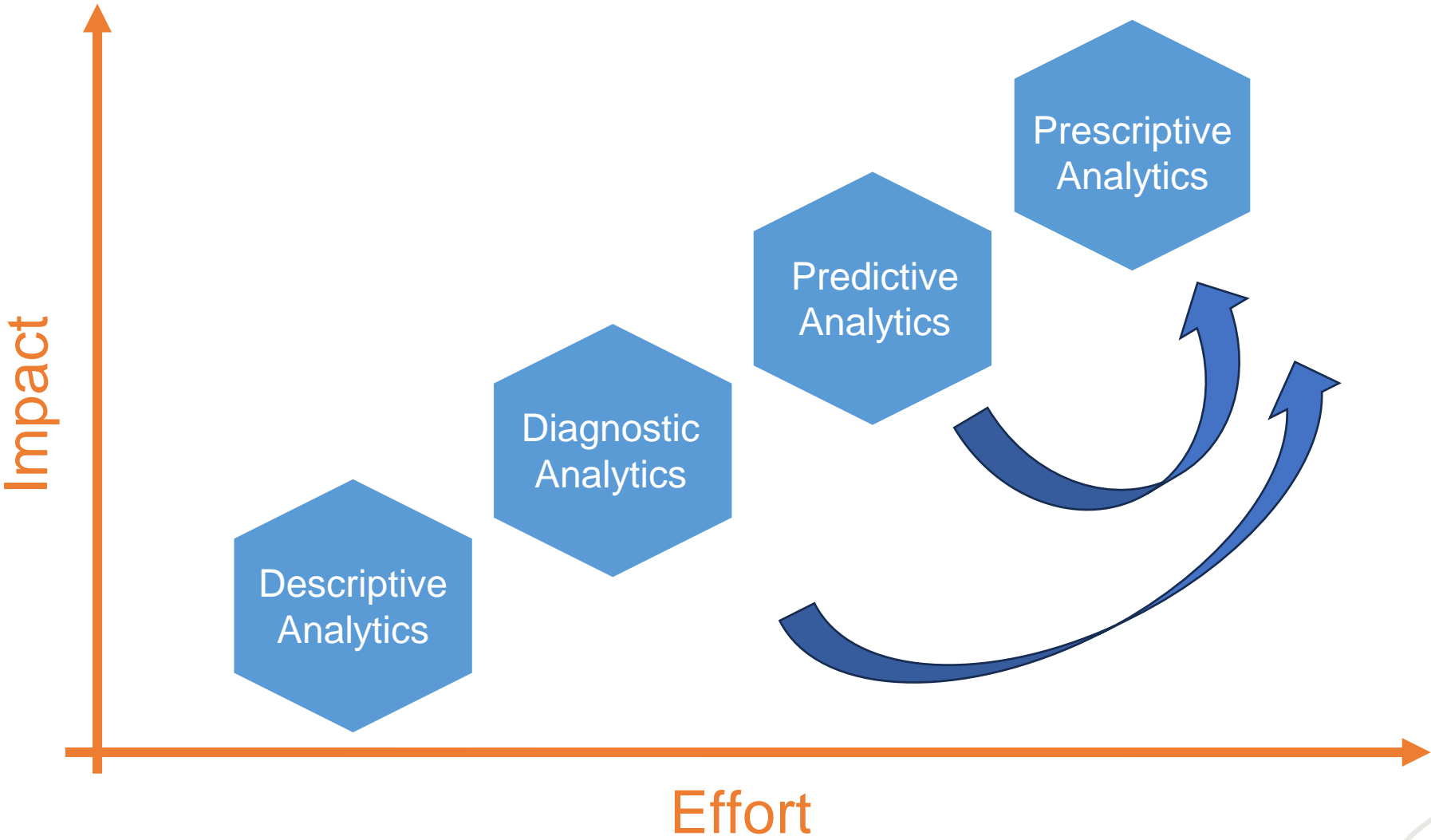


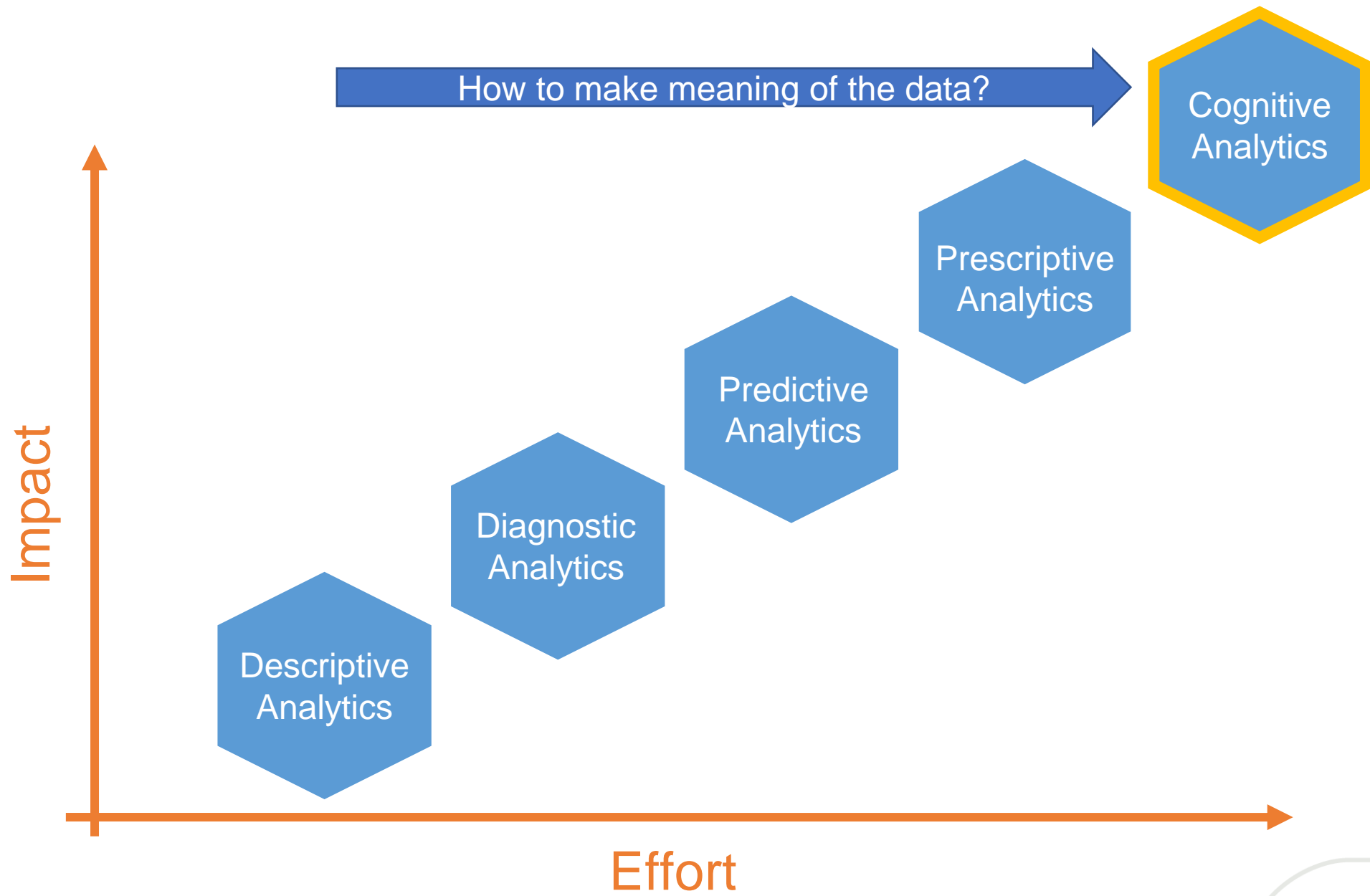
Trends Beyond the Analytics Continuum

- Cognitive Analytics / Generative AI
- Analytics Working Together (e.g. how do predictive and prescriptive analytics work together?)



Analytics Working Together





How to make meaning of the data?

Cognitive Analytics

Prescriptive Analytics

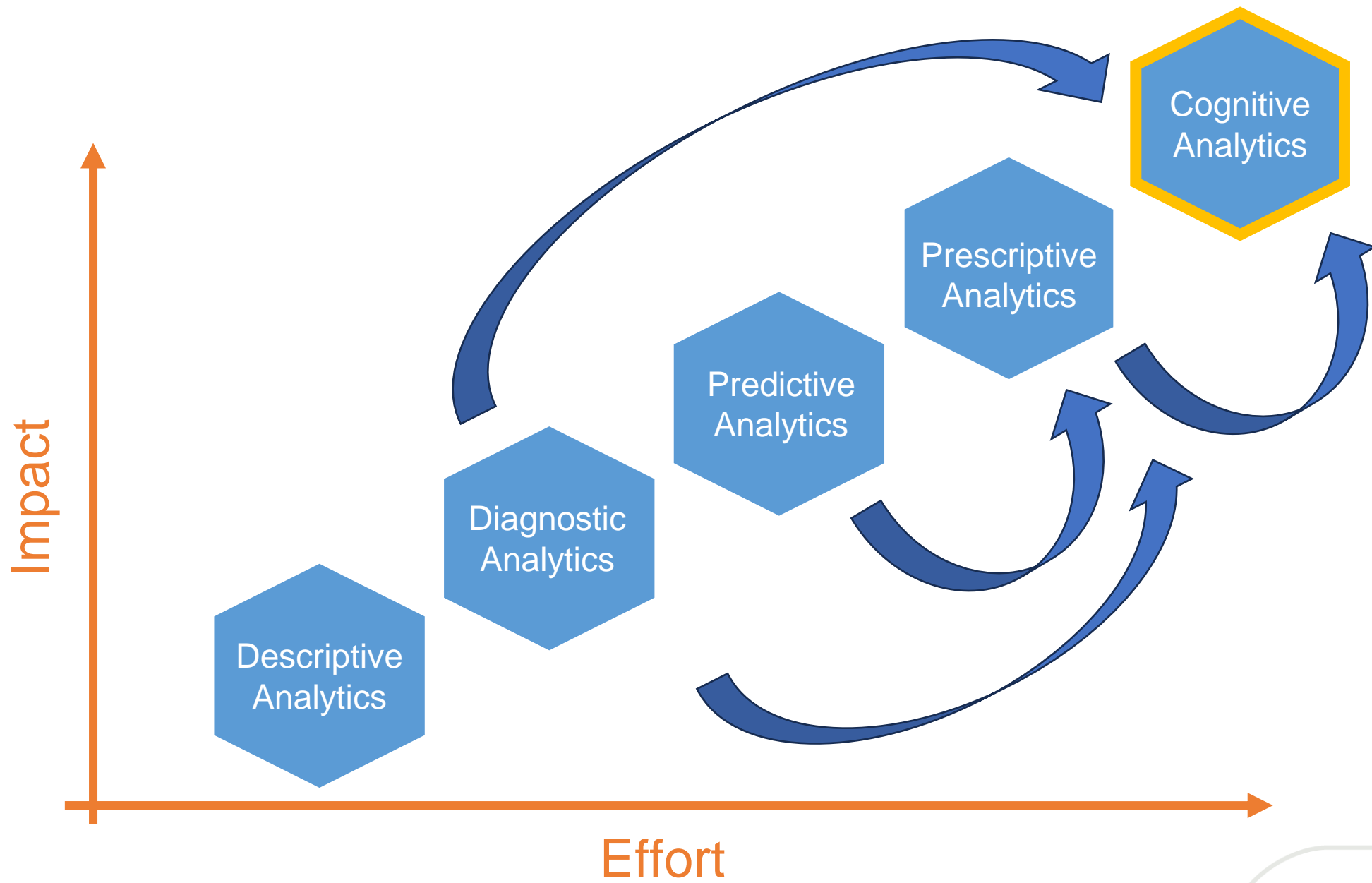
Predictive Analytics

Diagnostic Analytics

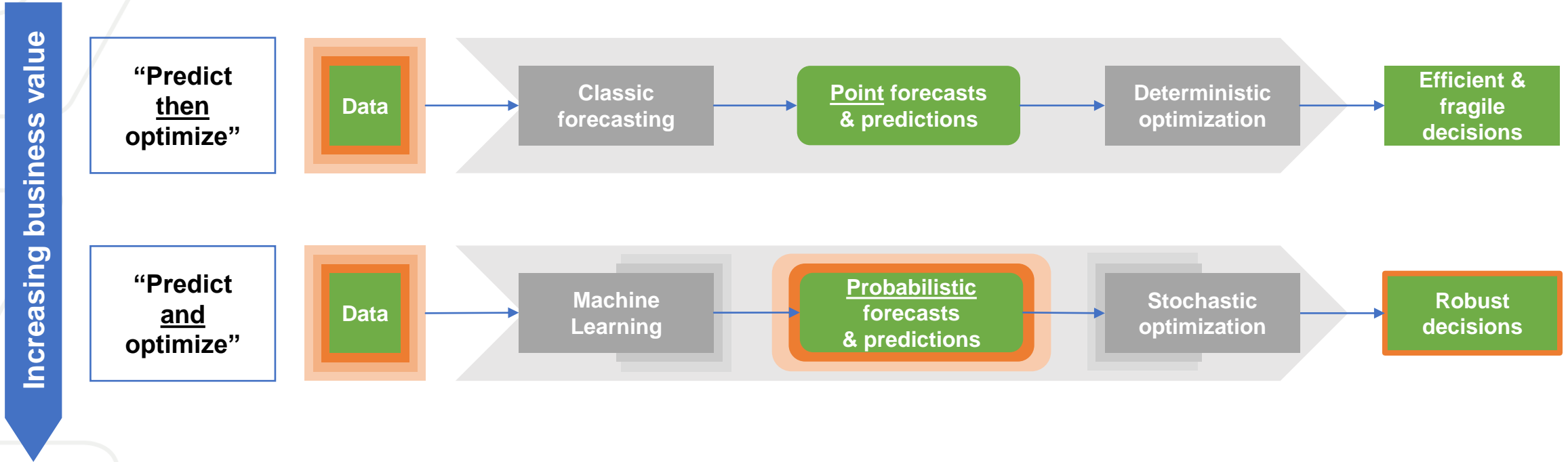
Descriptive Analytics

Effort

Impact



One way to connect Predictive + Prescriptive Analytics, follows from recognizing that most parameters in optimization models contain uncertainty, and that their values can be forecasted or predicted with Machine Learning.



Extending optimization projects towards forecasting & prediction is already challenging, and upgrading to stochastic optimization is not trivial

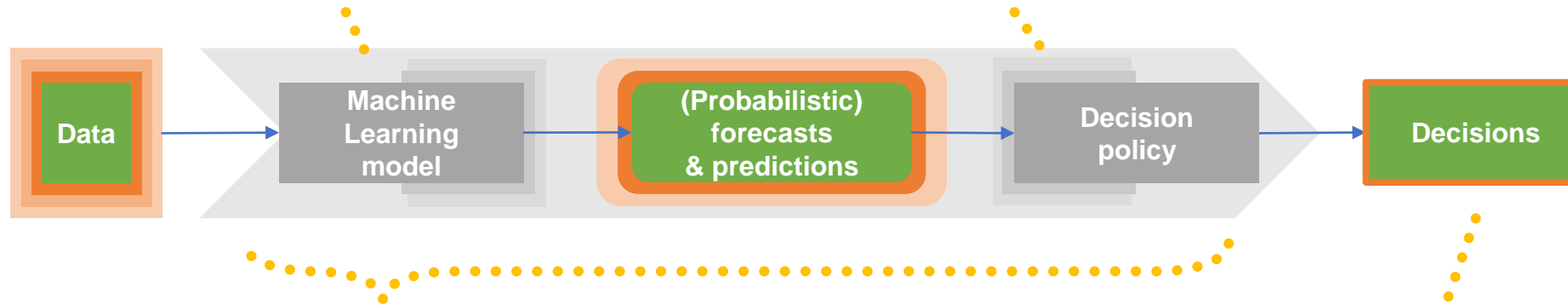
Use cases of Generative AI and Machine Learning in Planning & Decision Making

Machine Learning for predictions

- Demand forecasting
- Lead time prediction
- Productivity prediction

Machine Learning for decision making

- Parameter tuning in optimization models
- Learning inventory policies
- (Deep) Reinforcement Learning



Generative AI as conversational UI (AI co-pilot)

- Interactive dashboarding & drilldowns (BI on-the-fly)
- Explainability (e.g. external & cross-departmental drivers)
- Guided scenario planning & optimization
- Providing (& processing) feedback about algorithm results

Generative AI for automation of repetitive tasks (AI pilot)

- Information exchange with suppliers & customers
- Preparing (S&OP) meetings
- Identifying and correcting master data issues
- Interpreting events inside & around SC network

Trigger questions for identifying Generative AI use cases

- What insights are in the data, but difficult to obtain with available screens or apps?
- What insights are *not* in (structured) data, but do affect Supply Chain performance?
- What repetitive, time-consuming tasks would benefit from automation?

Trigger questions for identifying Machine Learning use cases

- What data (or MIP parameters) contain most uncertainty? ... and what is their effect on solution quality?
- Which parameters are set manually and could be learned from data?

Closing Thoughts

- Evolution of analytics at an organization follows analytics continuum
- Though more impact is seen at later stages of continuum, key value is still found at descriptive and diagnostic analytics
- Beyond the continuum:
 - Cognitive Analytics / Generative AI
 - Combination of analytics

Upcoming SCAS Courses

Transforming Supply Chain Management and Performance Analysis

January 27, 2025 to January 30, 2025 | Virtual (Instructor-led)

Creating Business Value with Statistical Analysis

March 24, 2025 to March 27, 2025 | Virtual (Instructor-led)

Machine Learning Applications for Supply Chain Planning

May 12 to May 13, 2025 | Savannah, GA

September 15, 2025 to September 18, 2025 | Virtual (Instructor-led)

Supply Chain Optimization and Prescriptive Analytics

December 1, 2025 to December 4, 2025 | Virtual (Instructor-led)

FAQ:

- **How can I register for a course?** Register for courses on the GT Professional Education website. There's a drill down under subjects (choose 'Supply Chain and Logistics').
<https://pe.gatech.edu/subjects#supply-chain-and-logistics>
- **Courses Costs?**
<https://www.scl.gatech.edu/sites/default/files/downloads/gtscl-courseregform.pdf>
- **Discount/Scholarship opportunities?** Special Discounts are available:
 - GA-AIM: All residents of the State of Georgia are eligible for a 50% discount while funds last thanks to a grant from the U.S. Department of Commerce's Economic Development Administration. Use of this discount is subject to verification of GA residency.
 - SCL-Certification: Non-Georgia residents can register and pay for all required courses in a Supply Chain & Logistics certificate and receive a discount of 17% off per course.
 - Organization/Group: if you have 3 or more participants from your organization, please contact us for volume discounts at course@scl.gatech.edu.
- **Which course would most benefit my career?** We have several options and it depends on your career interest. We are happy to discuss with you the opportunities. Please reach out to course@scl.gatech.edu.

Upcoming SCL Lunch and Learn Opportunities

Generative AI for Supply Chains

w/ Chris Gaffney & Frederick Benaben

Thursday, January 2nd 12-1pm ET | Zoom Registration Link



scl.gatech.edu/jan25-Intl



**Supply Chain and
Logistics Institute**

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