

Smart people, with smart technology – how Open Science with Open Data can push Smart Cities to next level

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How do we define Smart Cities?

ISO Definition

A new concept and a new model, which applies the new generation of information technologies, such as the internet of things, cloud computing, big data and space/geographical information integration **to facilitate the planning, construction, management and smart services of cities.**

Source: ISO Smart Cities Report, 2014

EU Definition

A smart city is a place where **traditional networks and services are made more efficient** with the use of digital and telecommunication technologies **for the benefit of its inhabitants and business.**

Source: European Union Official Web Site

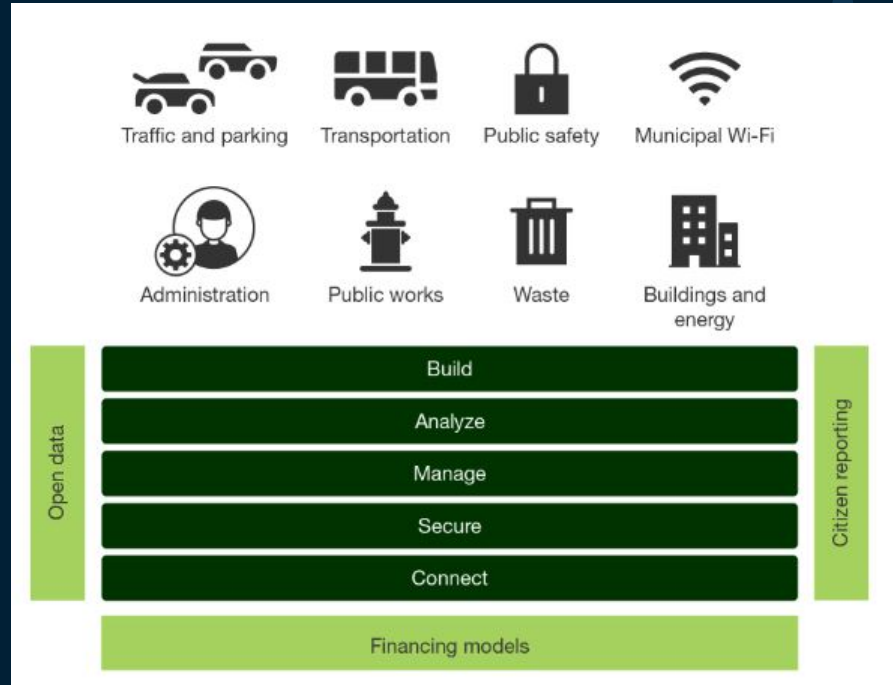
Smart City Platforms as a Foundation

Data and Analytics as the Foundation of Smart Cities

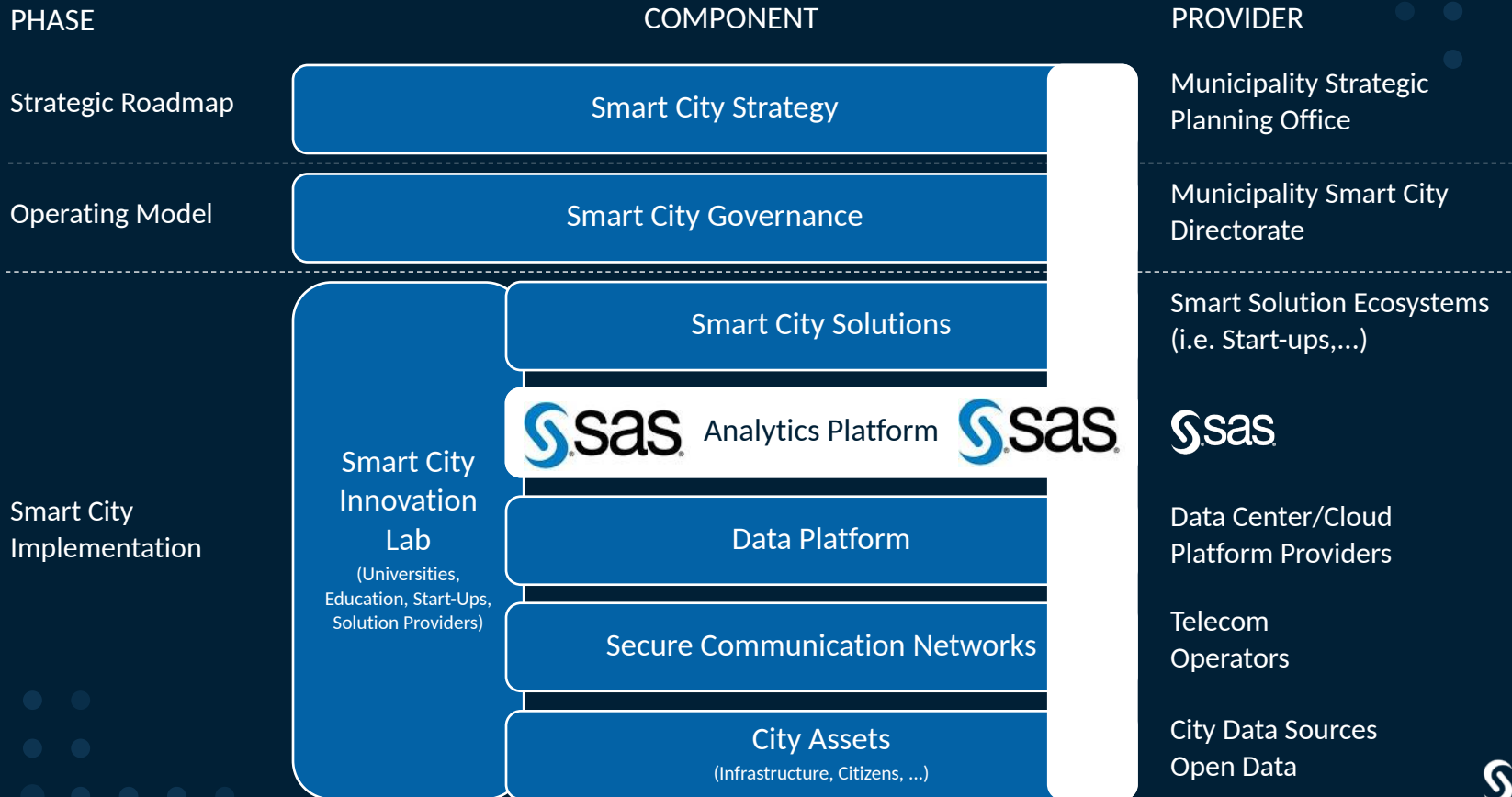
City leaders understand that the key to becoming smart is having access to information, and to use that information to **improve citizen services and city operations.**

Smart city platforms provide a foundation for urban infrastructure, applications, and services, plus several city-specific functions.

Source: Forrester, Smart City Platforms Enable The Insights-Driven City Report, December 3, 2018



Analytics Platform City Transformation Components



Analytics Platform City Transformation Design Principles

- **Dual Transformation**
 - Creating a new smart city (Innovation Management)
 - Optimizing the current city with the new smart city (Change Management)
- **Data & Analytics Driven**
 - Managing the city big and open data for the development of analytics driven smart services
 - Modeling, forecasting, simulating and optimizing the city by advanced analytic capabilities
- **Holistic & Integrated**
 - End to end coverage by SAS together with consulting and telecom partners
 - Strategic roadmap, operating model, implementation and support
- **Sustainable Inclusiveness**
 - People Participation + City Objectives + New City Technologies
 - Institutionalize and centralize by leveraging current capabilities and developing intelligent capabilities

SAS Viya: An Open Platform for Data and AI

Providing Flexible Integrations Across the Data and AI Lifecycle

Data Engineers



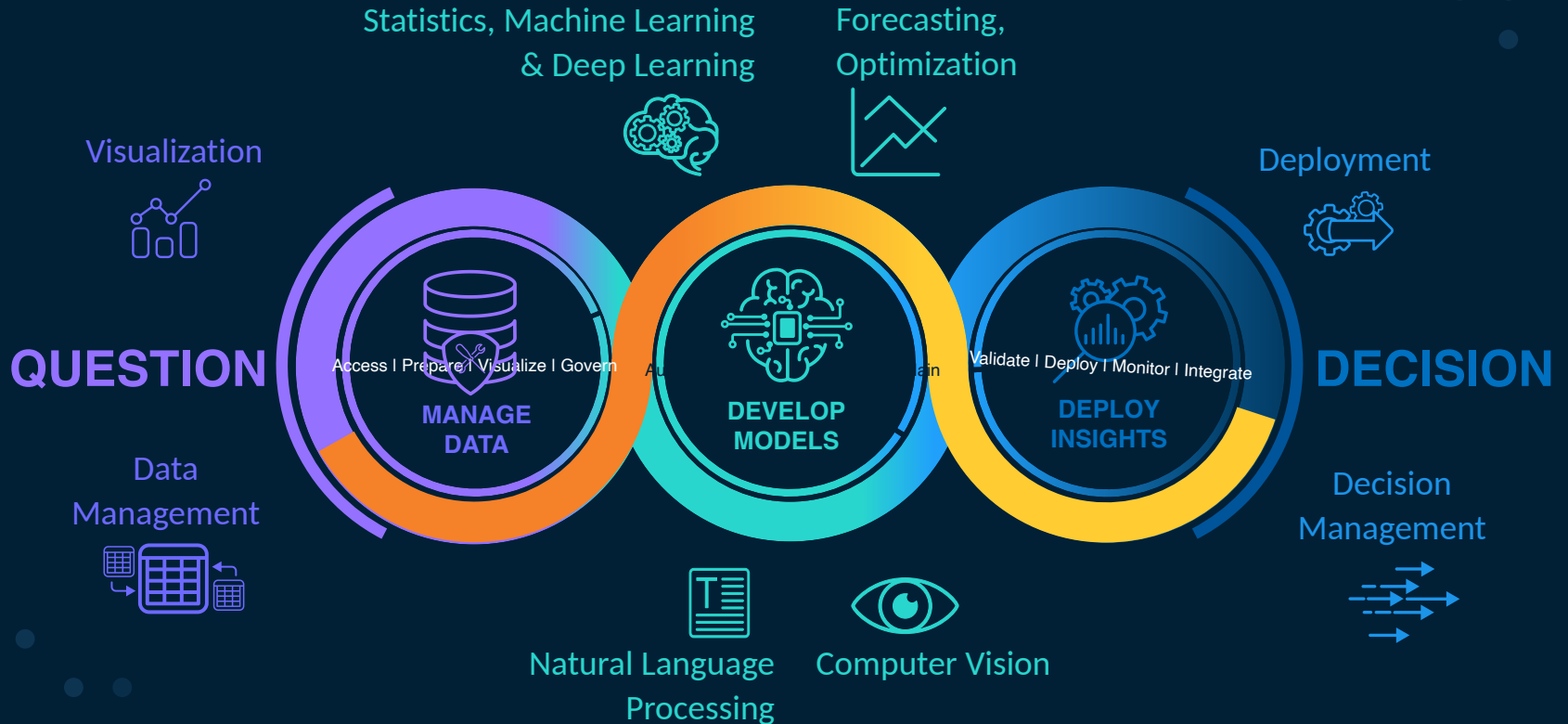
sas viya

Open Container Initiative



Business Analyst
Citizen DS
Non-Coder

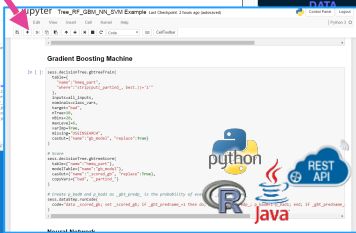
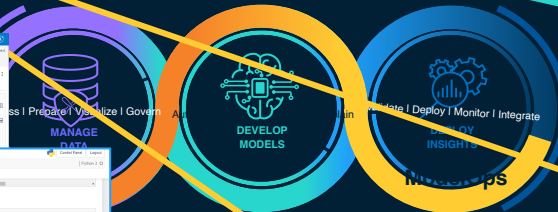
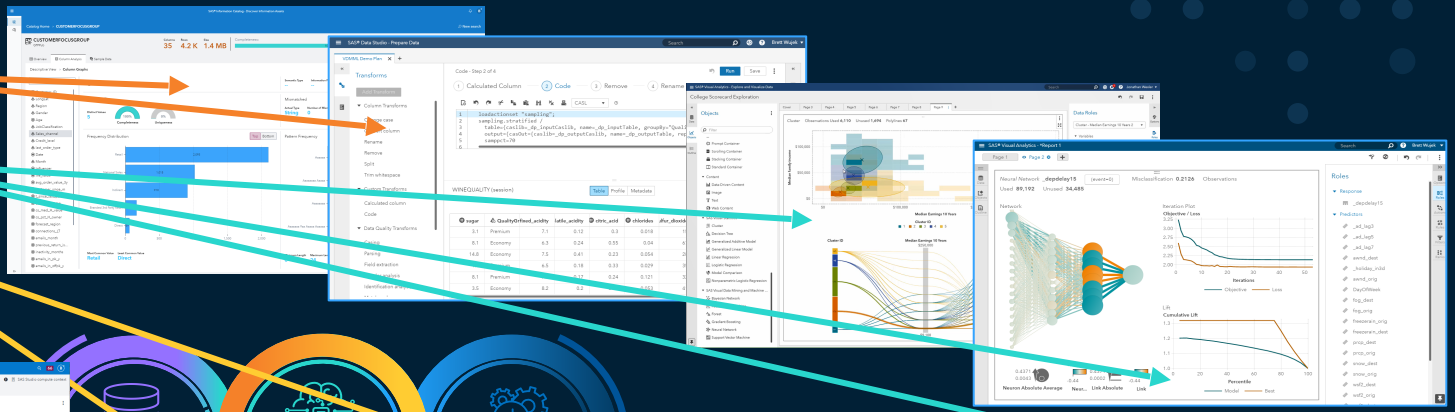
The SAS Analytics Lifecycle



The Analytics Life Cycle

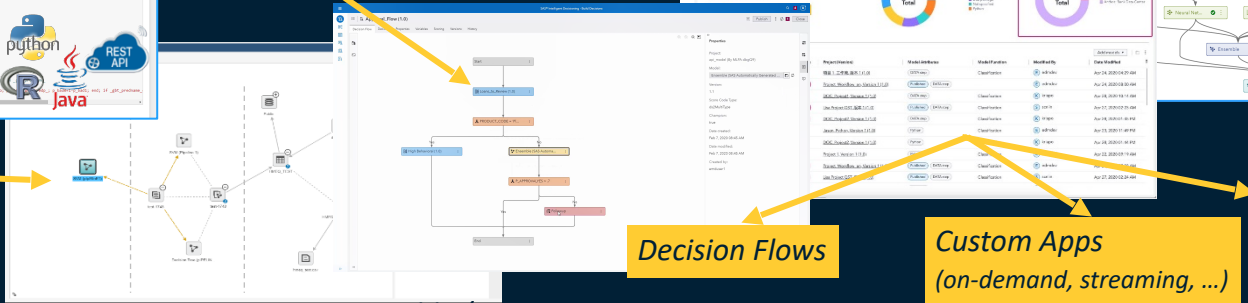
ANALYTICS LIFE CYCLE

- Discover Information Assets
- Manage Data
- Prepare Data
- Explore and Visualize
- Build Models
- Manage Models
- Build Decisions
- Share and Collaborate
- Develop Code and Flows



ADMINISTRATION

- Build Custom Graphs
- Manage Themes
- Explore Lineage
- Manage Environment
- Manage Workflows
- Build Conversational Flows



Decision Flows

Custom Apps
(on-demand, streaming, ...)



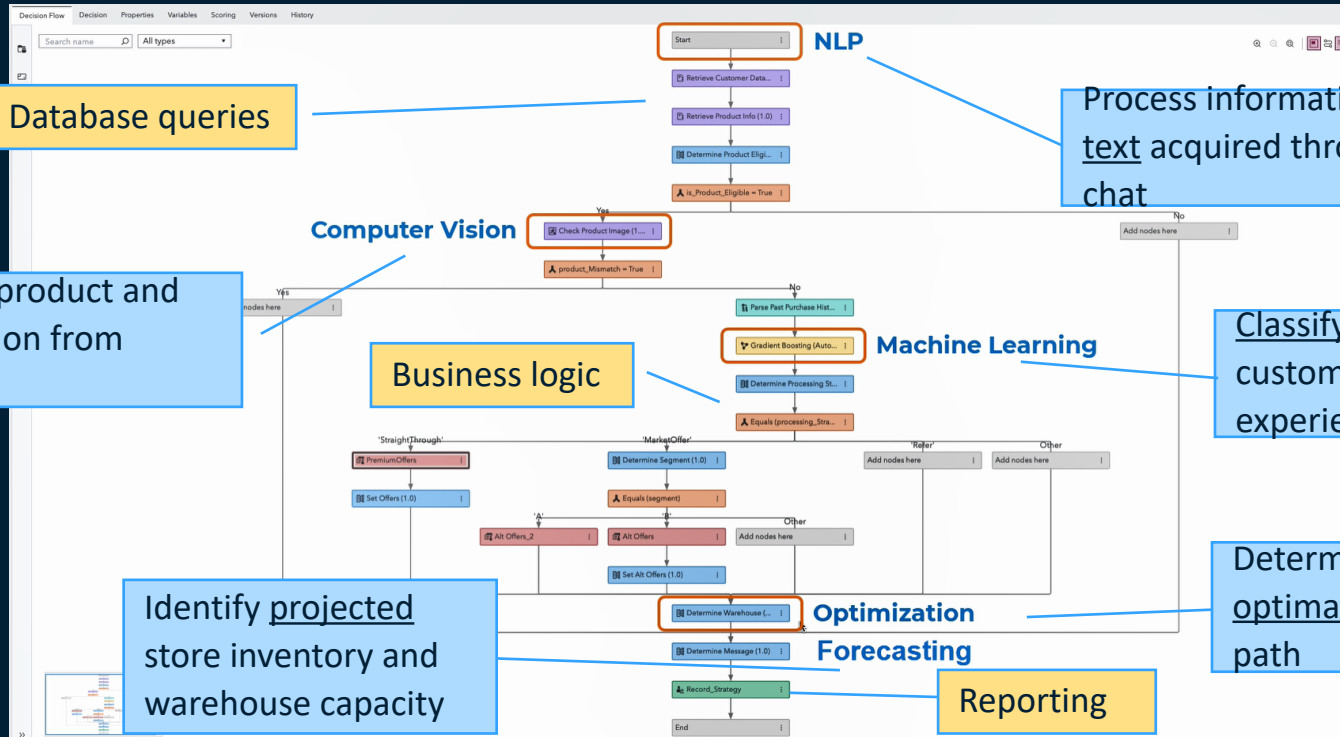
Public/Private Cloud or On Premises





Composite AI

What does a “decision” look like?



Database queries

NLP

Process information from text acquired through chat

Computer Vision

Verify product and condition from image

Business logic

Machine Learning

Classify customer for customized experience

Identify projected store inventory and warehouse capacity

Optimization Forecasting

Determine optimal return path

Reporting

WHAT IS TRUSTWORTHY AI? WHAT IS TRUSTWORTHY AI?

Artificial Intelligence

Developing
and using AI
technologies
in an ethical
manner

Asking not just,
"Could we?" but
also, "Should we?"

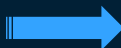
Ensuring AI does
not harm people

Building AI that
reflects our values
as a society

THE PROBLEM WITH BIAS

DISCLOSE DATA

A person, process, or system creates, and publishes/ shares data



STAGE AND PREPARE DATA

A person, process, or system transforms, moves, or analyzes data.

CONSUME DATA

A person, process, or system benefits from manipulated data

ACQUIRE
Ingest data from sensors, systems, or humans, recording its provenance and consent for use wherever possible

STORE
Record data to a trusted location that is both secure and easily accessible for further manipulation

PRE- PROCESS
Combine disparate datasets to create a larger dataset that is greater than the sum of its parts

MODEL BUILD
Examine and transform data with the purpose of extracting information and discovering new insights

MODEL DEPLOY
Apply the insights gained from data analysis towards making decisions, affecting change, or delivering a product or service

SHARE/ SELL
Provide Access to datasets or data insights to new sets of data manipulators or consumers

DISPOSE
Remove data from servers to prevent future release or use



Availability Bias
Recall Bias



Exclusion Bias
Pre-processing Bias
Measurement Bias
Time-interval bias
Historical Bias

Sample Selection:
Selection Bias
Attrition Bias

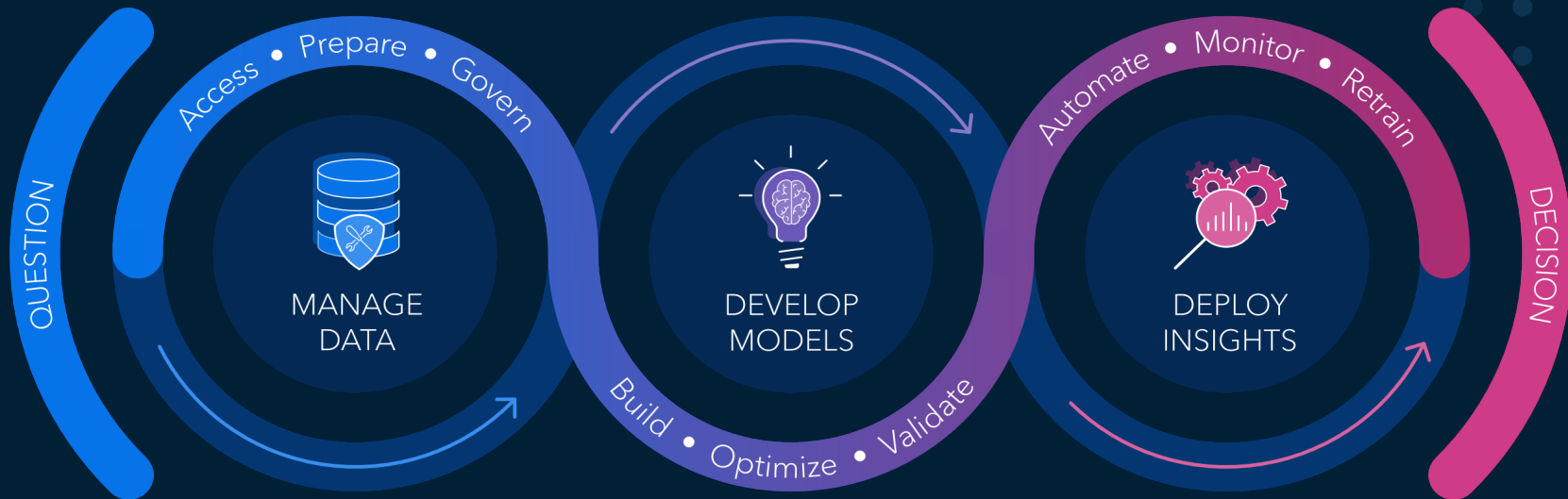
Confirmation Bias
Cause/ Effect Bias
Confounding Bias
Collider Bias
Prediction Bias
Performance Bias
Hindsight Bias
Chronological Bias
Funding Bias
Proxy Bias



Automation bias
Deployment Bias
Drift Bias
Reporting Bias

COMMON BIASES

BIAS IN AI & ANALYTICS LIFECYCLE



Availability Bias
Recall Bias

Exclusion Bias
Pre-processing Bias
Measurement Bias
Time-interval bias
Historical Bias
Sample Selection:
Selection Bias
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SAS Academic Programs

No-Cost Support for Universities – 4 main layers:



1. SAS Software

Software for teaching and learning



2. Educator Training

Custom workshops and access to training materials



3. Academic Support

Curriculum consultation to support integration of analytics into the classroom



4. SAS Specialization Programs

SAS Specializations highlight SAS skill through digital badges and credentials



Thank You

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