



AI-Enabled R&D in ACLS: Better Scientific Decisions, Faster Translation

CSIR AI Symposium

24 August, CSIR ICC

Prof Moses Cho & Dr Tsepo Tsekoa
AI Champions
Advanced Chemicals and Life Sciences



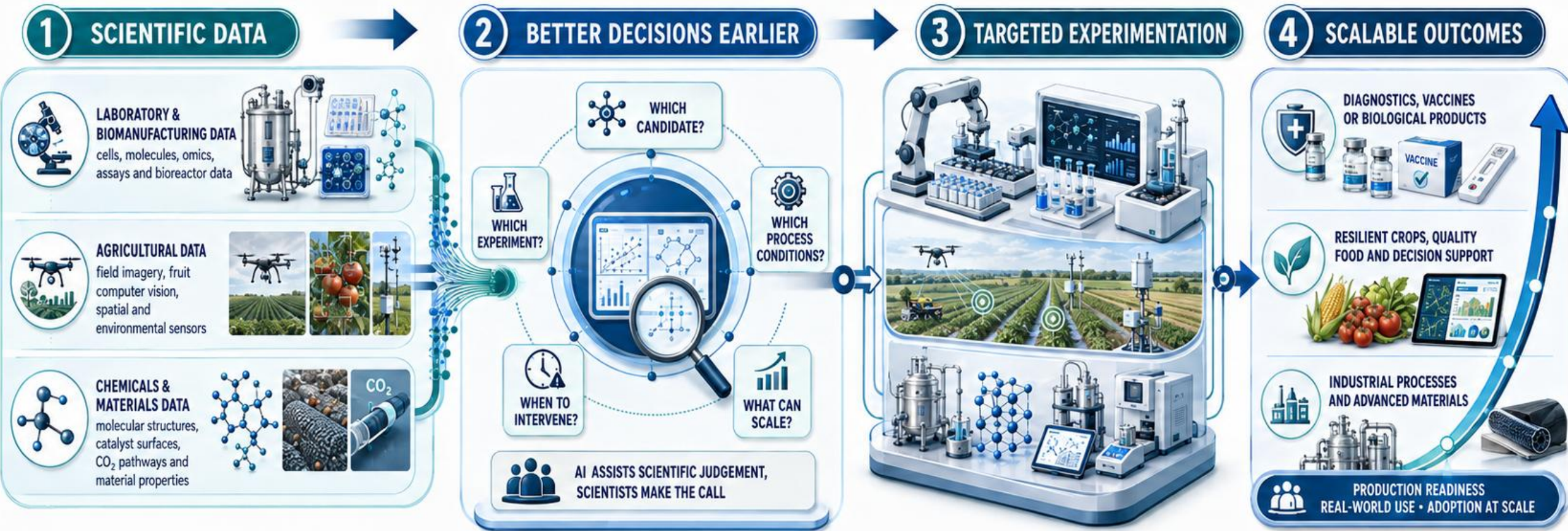
science, technology
& innovation

Department:
Science, Technology and Innovation
REPUBLIC OF SOUTH AFRICA



AI can shorten the journey from scientific discovery to impact

Across health, agriculture and food, and chemicals and materials, AI can help ACLS make better scientific and development decisions earlier.



HEALTH INNOVATION



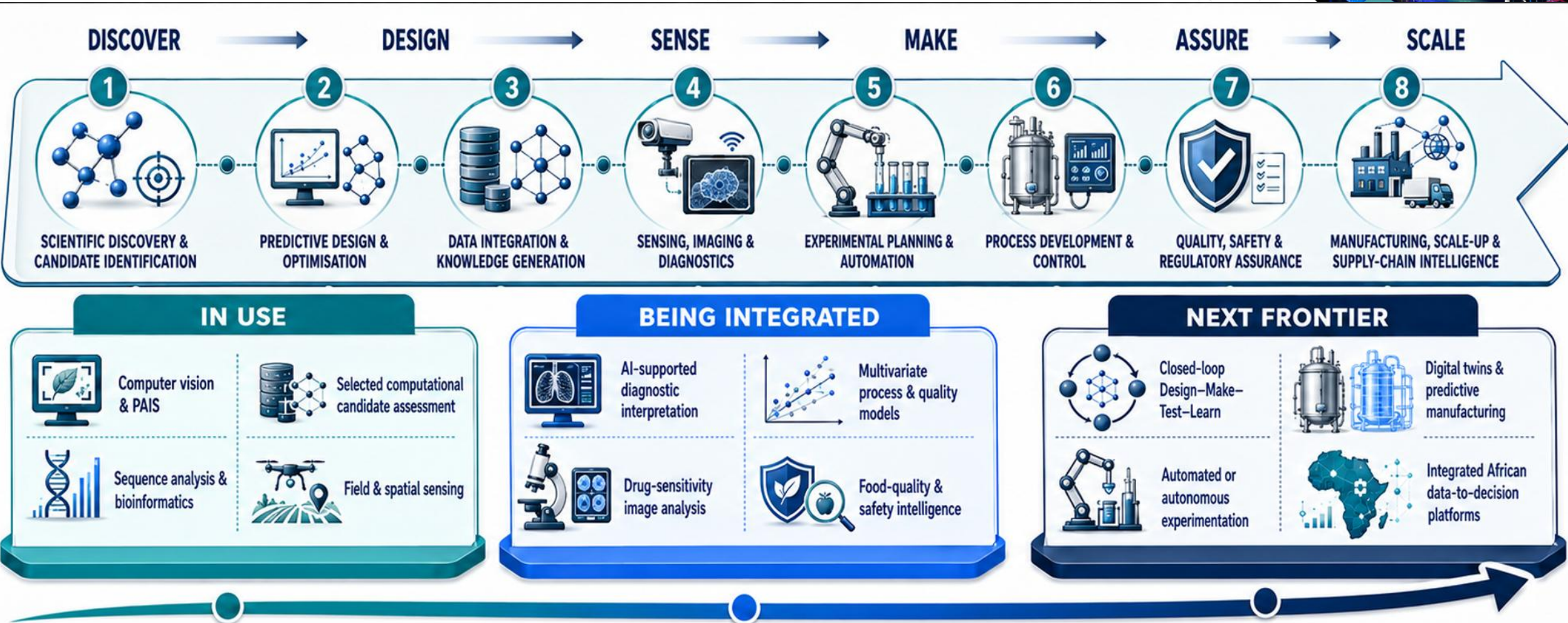
ADVANCED AGRICULTURE & FOOD



CHEMICALS & MATERIALS

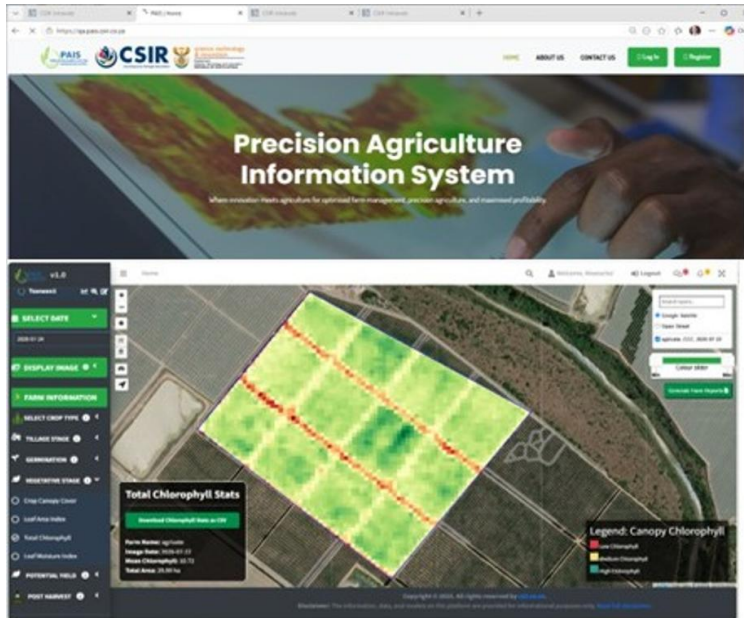
BETTER DECISIONS EARLIER • FEWER UNPRODUCTIVE ITERATIONS • FASTER PATHS TO VALIDATED IMPACT

ACLS spans demonstrated AI, active integration and frontier opportunity

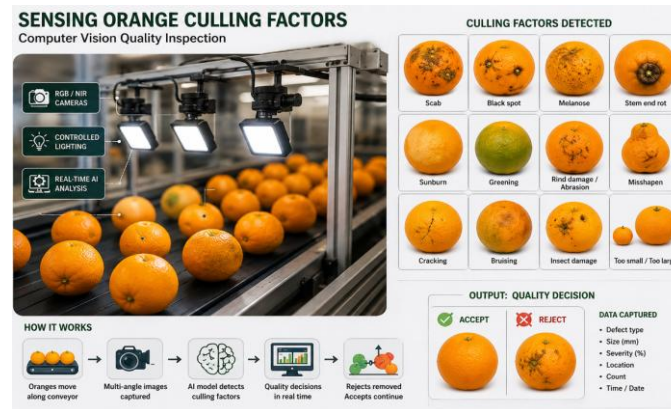


BROAD OPPORTUNITY • UNEVEN MATURITY • A COMMON INTEGRATION CHALLENGE

Exemplar 1: Computer vision - Applications in agriculture for Precision Agriculture and Food Safety; In-field assessment of quality & yield, and packhouse culling factors



Objective: To leverage advanced computer vision techniques for precision agriculture and food safety - to automate the estimation crop/animal production and quality in the field, detect defects and food safety risks, and analyze packhouse culling factors, thereby reducing waste, enhancing quality assurance, and improving the sustainability and profitability of agricultural production systems.



SENSE

Phone, camera, drone, satellite

**INTERPRETATION
using AI**

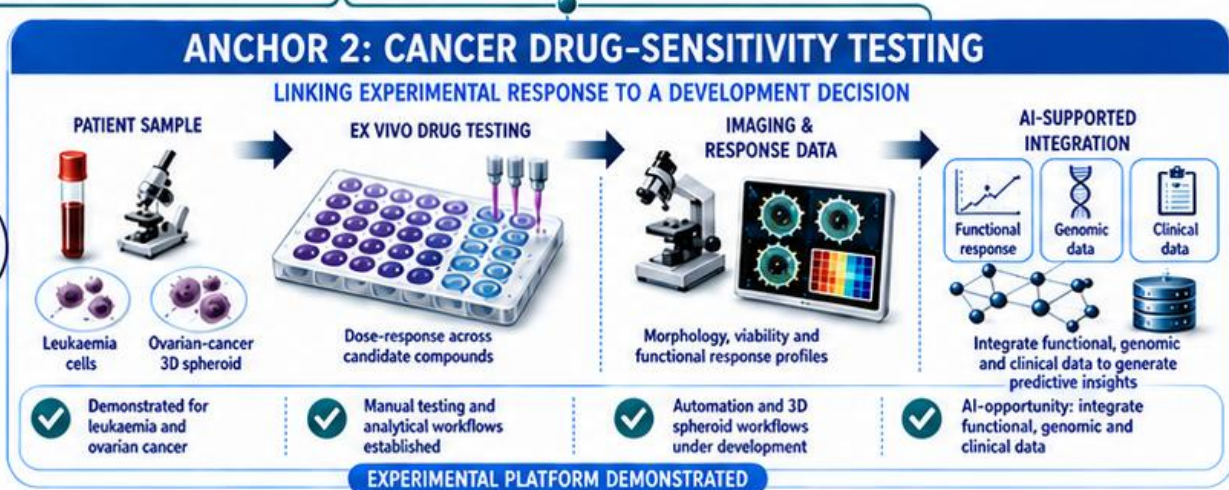
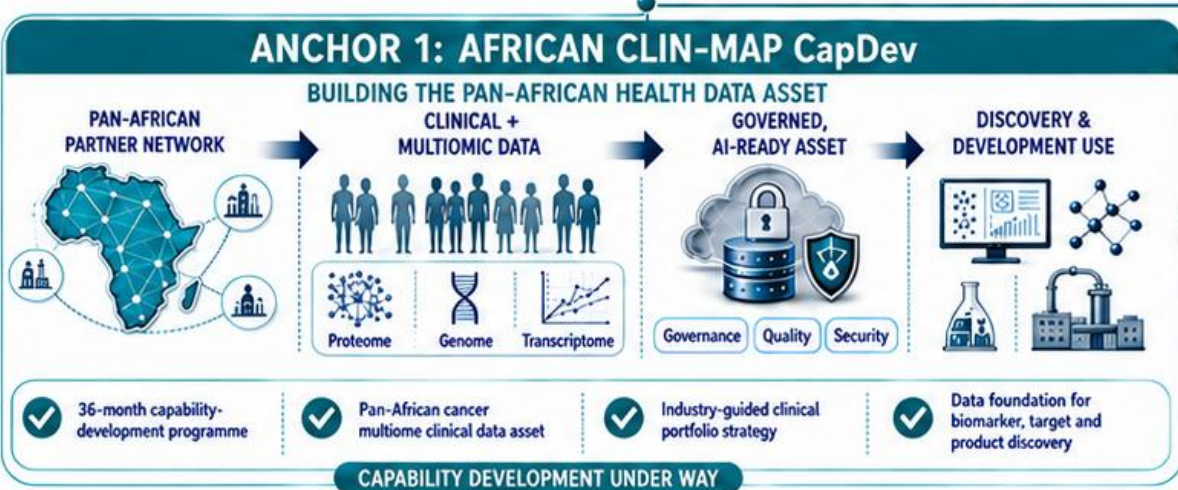
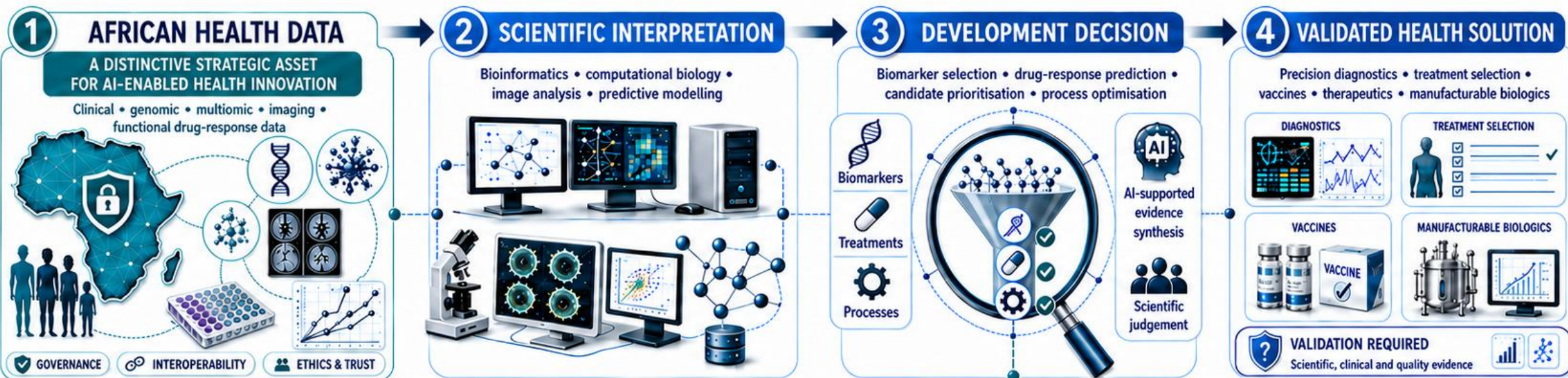
Soil & Crop health, yield estimation,
packhouse food condition

DECIDE

When, what and how – input
application, quality etc.

ACT

Precision application of inputs ,
Harvest, treat, grade, comply



AFRICAN DATA + EXPERIMENTAL EVIDENCE = BETTER HEALTH-DEVELOPMENT DECISIONS
CURRENT POSITION: DISTINCTIVE DATA AND EXPERIMENTAL PLATFORMS EMERGING • AI-SUPPORTED INTEGRATION AND CLINICAL TRANSLATION STILL TO BE PROVEN

Exemplar 3: In chemicals and materials, predict before we synthesise and scale

MANY POSSIBLE PATHWAYS



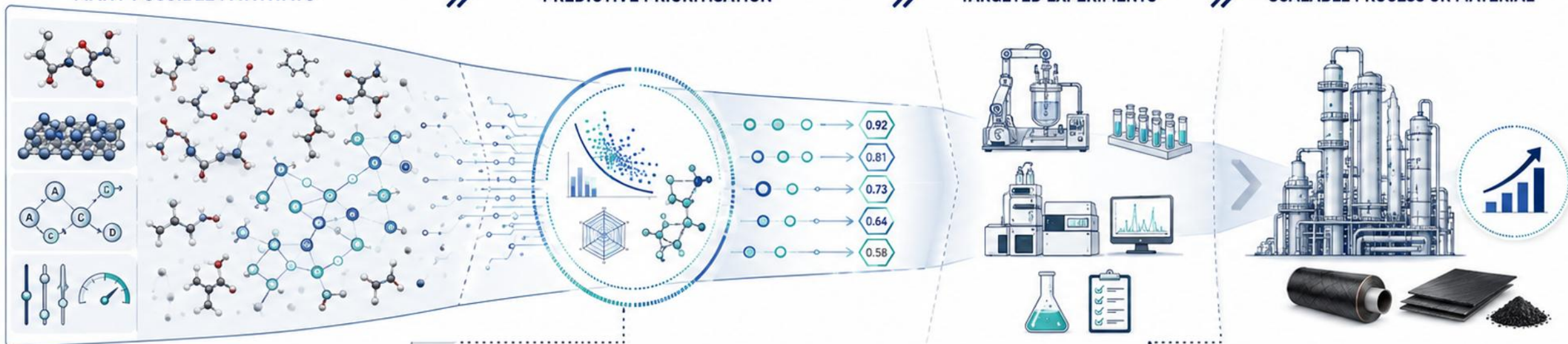
PREDICTIVE PRIORITISATION



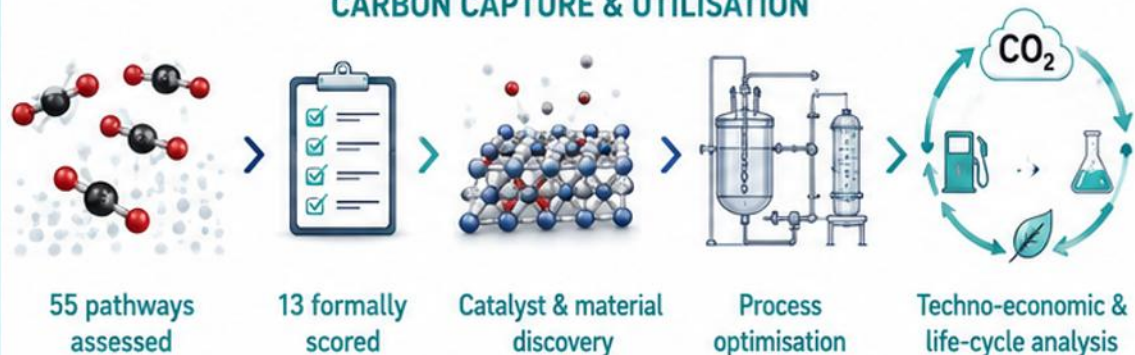
TARGETED EXPERIMENTS



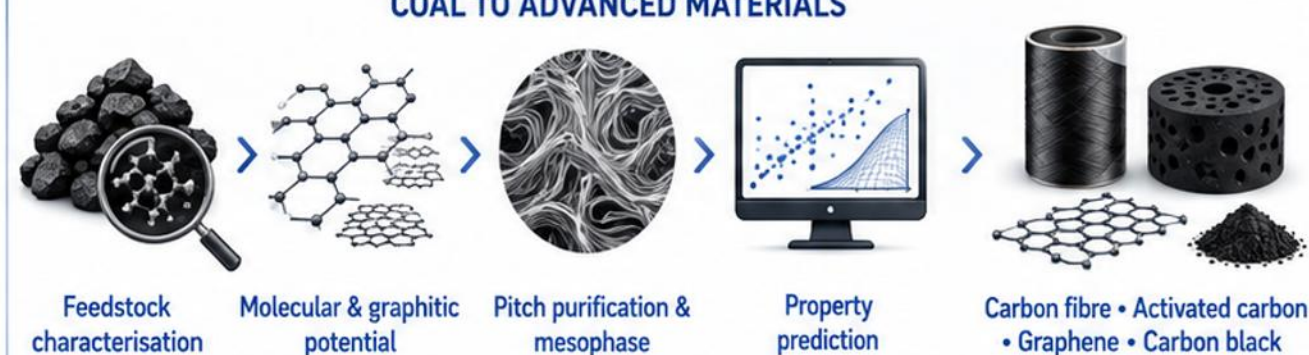
SCALABLE PROCESS OR MATERIAL



CARBON CAPTURE & UTILISATION



COAL TO ADVANCED MATERIALS



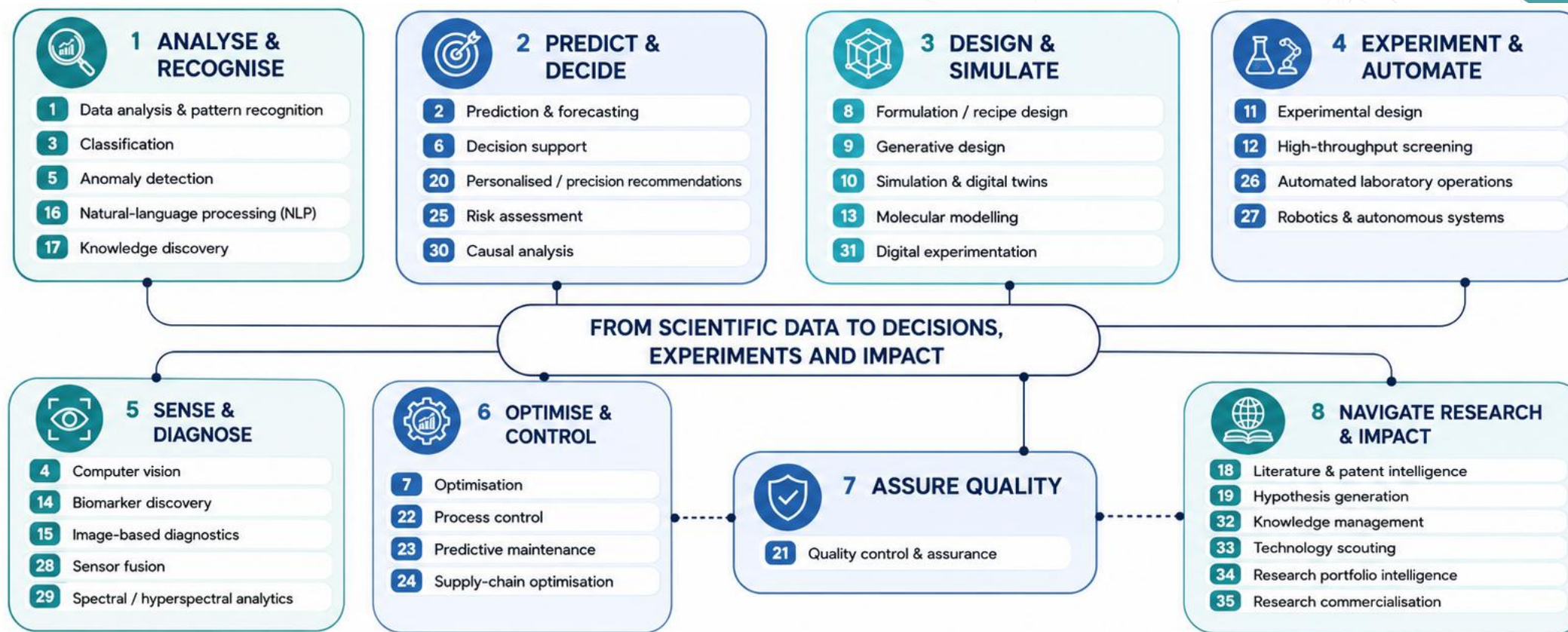
CURRENT POSITION: STRUCTURED PATHWAY ANALYSIS AND EMERGING DATASETS; AI DEMONSTRATORS STILL TO BE ESTABLISHED



PARTNER ACCESS: INDUSTRY • UNIVERSITIES • STATE ENTITIES • COMPUTATIONAL PLATFORMS • SPECIALIST PILOT FACILITIES



ACLS has identified 35 AI applications, but they vary substantially in maturity and strategic value



CURRENT POSITION: APPLICATIONS SPAN IN USE, BEING INTEGRATED AND NEXT-FRONTIER OPPORTUNITIES; DETAILED MATURITY ASSESSMENT REQUIRED.

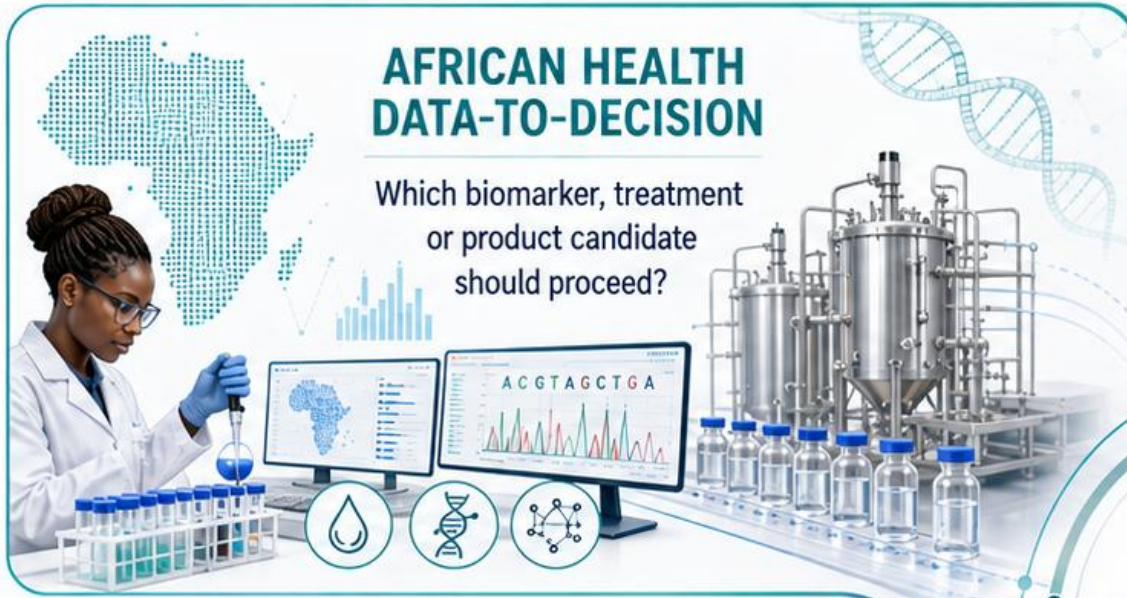


THE STRATEGIC TASK IS TO PRIORITISE APPLICATIONS WITH STRONG DATA, DECISION VALUE, VALIDATION POTENTIAL AND A CREDIBLE ROUTE TO ADOPTION.

Four strategic opportunity areas can concentrate ACLS investment and learning

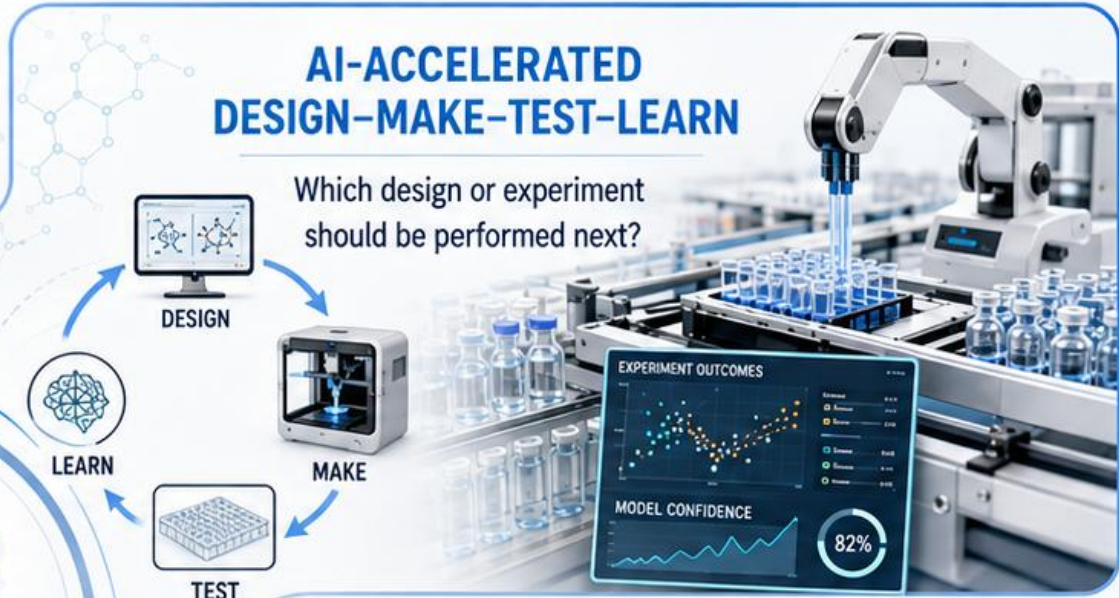
AFRICAN HEALTH DATA-TO-DECISION

Which biomarker, treatment or product candidate should proceed?



AI-ACCELERATED DESIGN-MAKE-TEST-LEARN

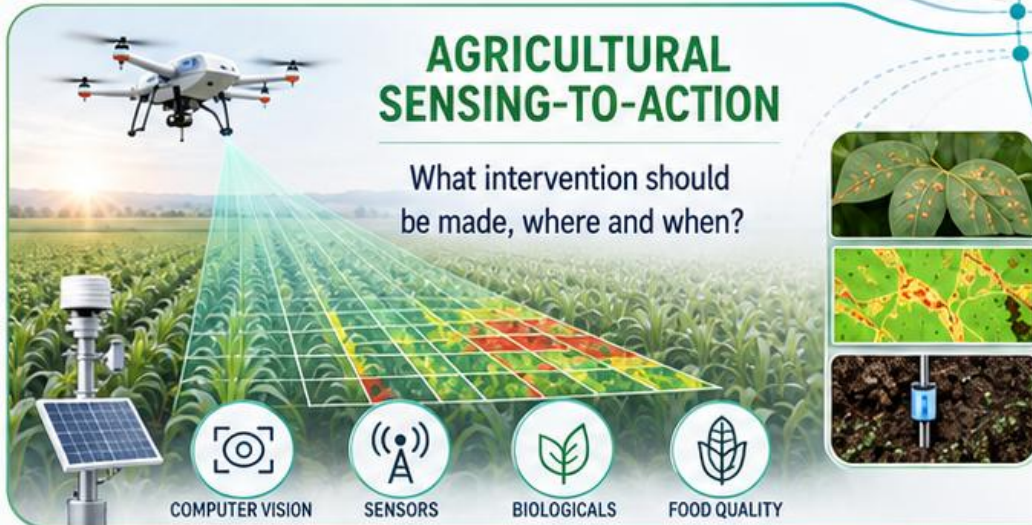
Which design or experiment should be performed next?



BETTER DECISIONS EARLIER

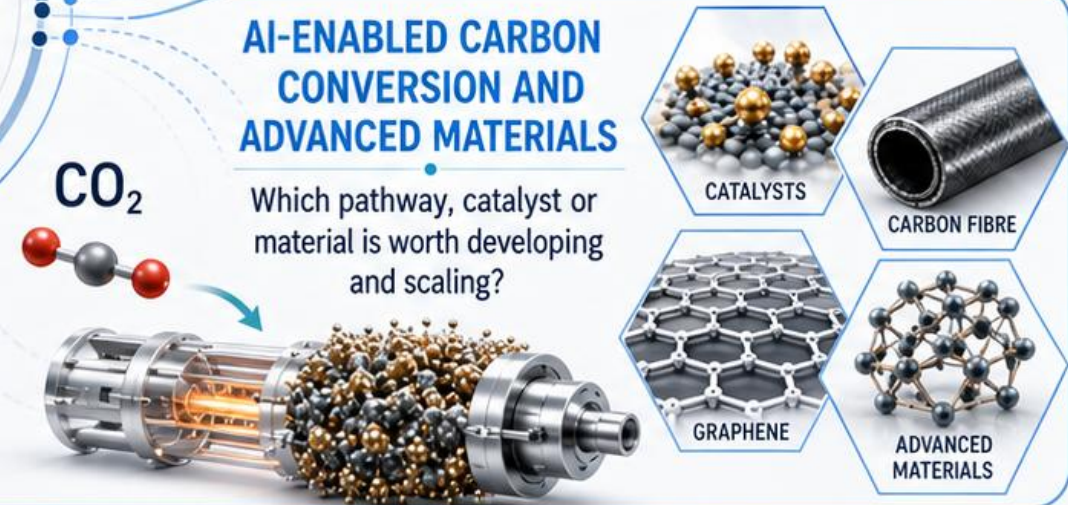
AGRICULTURAL SENSING-TO-ACTION

What intervention should be made, where and when?



AI-ENABLED CARBON CONVERSION AND ADVANCED MATERIALS

Which pathway, catalyst or material is worth developing and scaling?



DATA

•



EXPERIMENTAL VALIDATION

•



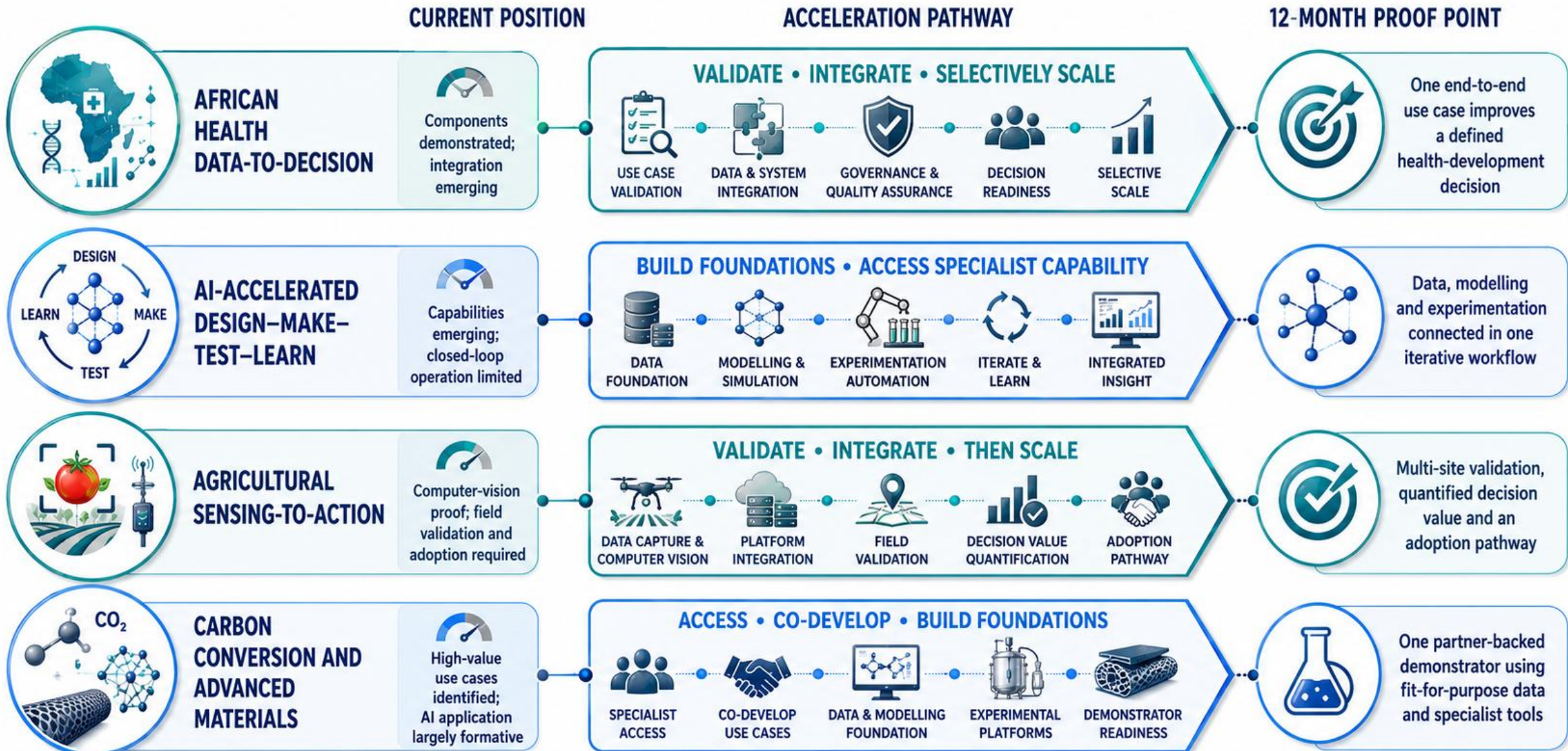
ACCOUNTABLE OWNER

•

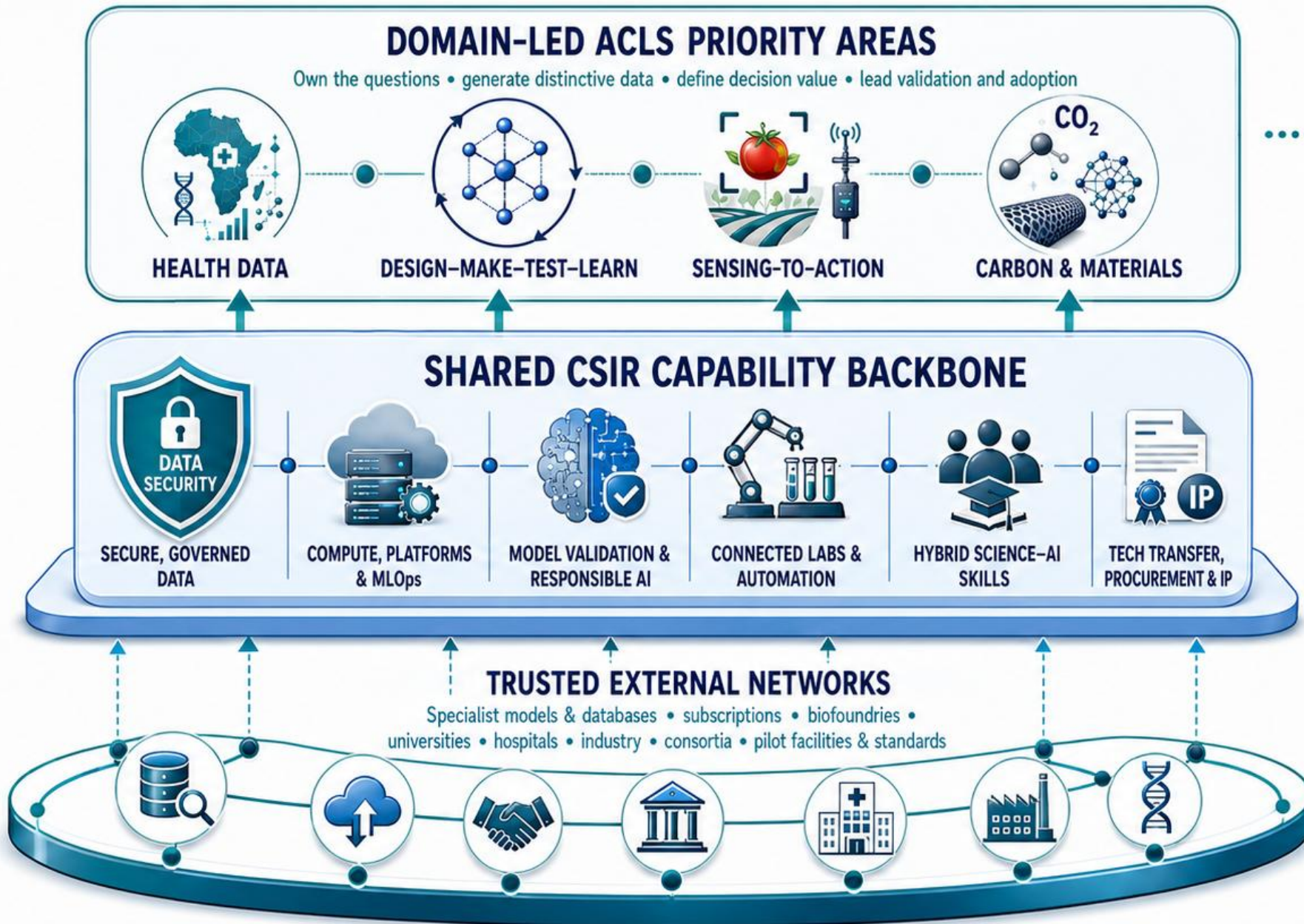


ADOPTION PARTNER

Each priority area requires a different acceleration pathway



Scale through a shared CSIR backbone and trusted external networks



LINKED ROADMAP PRIORITIES

4

SECURE TARGETED NETWORK ACCESS

Subscribe, partner or co-develop where building internally adds little value

3

ESTABLISH THE MINIMUM SHARED BACKBONE

Provide only the data, compute, security, governance and workflow support required

2

LAUNCH MATURITY-MATCHED DEMONSTRATORS

Select a small number of credible 12-month proofs

1

MOBILISE & PRIORITISE

Assess use cases, owners, data readiness, validation needs and partners

Thank you