King Abdullah University of Science and Technology

جامعة الملك عبدالله للعلوم والتقنية

UN Training - Day 4

Data and AI Strategy

UN TECHNOLOGY
UNITED NATIONS TECHNOLOGY BANK FOR LEAST DEVELOPED COUNTRIES

أكاديمية كاوست
KAUST ACADEMY

جامعة الملك عبدالله
للعلوم والتقنية
King Abdullah University of
Science and Technology

Why AI Matters for LDCs

UN TECHNOLOGY
UNITED NATIONS TECHNOLOGY BANK
FOR LEAST DEVELOPED COUNTRIES

أكاديمية كاوست
KAUST ACADEMY

Why AI Matters for LDCs

Maximizing Impact

AI multiplies the reach of scarce skilled expertise and time.

Focus on Value

Professionals tackle complex problems while AI handles repetitive tasks.

Leapfrog Development

Bypass traditional stages, e.g., mobile banking without physical branches.

Efficiency in Scarcity

Optimize limited resources in healthcare, agriculture, and energy.

Risk of Inaction

Falling behind in AI adoption can widen economic gaps, the "AI Divide."

AI with Local Context

Cultural Relevance

Avoid pre-packaged AI that ignores local realities.

Preventing Bias

Audit data for historical, cultural, or systemic biases.

Ethical Guardrails

Protect citizen data with strong privacy and governance standards.

Governance & Oversight

Ensure accountability, transparency, and human-rights-aligned AI.

UN TECHNOLOGY
UNITED NATIONS TECHNOLOGY BANK FOR LEAST DEVELOPED COUNTRIES

أكاديمية كاوست
KAUST ACADEMY

جامعة الملك عبدالله
للعلوم والتقنية
King Abdullah University of
Science and Technology

AI Readiness

UN TECHNOLOGY
UNITED NATIONS TECHNOLOGY BANK
FOR LEAST DEVELOPED COUNTRIES

أكاديمية كاوست
KAUST ACADEMY

AI readiness

AI readiness is an organization's (or country's) preparedness to successfully adopt and scale artificial intelligence, encompassing strong data foundations, robust infrastructure, skilled talent, clear governance, and strategic business alignment.

Pillars of AI Readiness

Key Pillars of AI Readiness

Pillar	What Success Looks Like	Common Pitfalls
Strategy & Ownership	Clear priorities, executive sponsorship, accountable outcomes	Disconnected pilots, unclear ownership, misaligned with strategy
Data Readiness	Trusted, accessible, scalable data for key use cases	Poor quality, siloed, time-consuming preparation
Technology & Foundations	Secure, resilient, enterprise-scale AI platforms	Fragile infrastructure, high costs, integration gaps
Talent & Operating Model	Skills, governance, and workflows for consistent AI delivery	Skills gaps, unclear roles, slow execution
Value & Risk	Measurable impact with responsible, compliant AI	No ROI tracking, low adoption, regulatory/reputation risk

Why AI Readiness Matters?

Competitive Advantage

AI-ready organizations deploy AI more effectively.

Value Realization

Turns AI ambition into scalable, measurable impact.

Risk Mitigation

Identifies gaps, data silos, skill shortages, unclear governance, that block ethical, successful AI.

AI Maturity Levels

Gartner AI Maturity Levels

Use this framework to assess your organization's current AI readiness and plan strategic investments.

1

Awareness

AI is largely unknown or only discussed in theory. Few pilot initiatives.

Example: Discussions around using AI for agriculture planning, but no concrete deployments.

Key Focus: Educating policymakers and stakeholders about AI potential.

1

Opportunistic

Small, isolated AI projects, often supported by international organizations.

Example: AI-based flood prediction tools in pilot projects funded by UN agencies.

Key Focus: Experimentation in high-impact areas like disaster response or health.

1

Systematic

AI adoption starts being coordinated within select ministries or sectors.

Example: AI solutions in healthcare diagnostics (e.g., AI-assisted imaging for disease detection).

Key Focus: Setting basic data standards, training staff, scaling successful pilots.

1

Differentiating

AI is used to improve key services and operations strategically.

Example: AI-driven mobile platforms for citizen engagement and agricultural advice.

Key Focus: Integrating AI into decision-making and citizen service delivery.

1

Transformational

AI is embedded across government processes, enabling proactive governance.

Example: Government use AI for national planning and disaster management but are mostly at Level 3–4.

Key Focus: Long-term vision for AI-driven governance; requires infrastructure and policy maturity.

جامعة الملك عبدالله
للعلوم والتقنية
King Abdullah University of
Science and Technology

AI Strategy

UN TECHNOLOGY
UNITED NATIONS TECHNOLOGY BANK
FOR LEAST DEVELOPED COUNTRIES

أكاديمية كاوست
KAUST ACADEMY

Strategic Framework for AI Integration

An AI Strategy is a roadmap for aligning artificial intelligence capabilities with core business objectives, ensuring scalable, ethical, and value-driven implementation across the organization.

(Vision × Value) + (Data + Tech) + (People × Adoption) + Governance = Sustainable AI Strategy

Strategy & Value

Vision + Business Case + ROI Metrics

Foundations

Data Quality + Infrastructure + Tech Stack

Execution

Change Management + Talent (People) + Adoption

Trust

Governance + Risk Management + Ethics

جامعة الملك عبدالله
للعلوم والتقنية
King Abdullah University of
Science and Technology

Vision

UN TECHNOLOGY
UNITED NATIONS TECHNOLOGY BANK
FOR LEAST DEVELOPED COUNTRIES

أكاديمية كاوست
KAUST ACADEMY

Strategic Prioritization (High Impact / Low Cost)

Agriculture

AI-powered pest detection via mobile phones and precision weather forecasting.

Healthcare

Automated diagnostic tools for rural clinics and optimized drug supply chains.

Education

Personalized learning platforms to bridge the teacher-to-student ratio gap.

Public Services

AI chatbots for government services in local dialects to improve accessibility.

جامعة الملك عبدالله
للعلوم والتقنية
King Abdullah University of
Science and Technology

Value

UN TECHNOLOGY
UNITED NATIONS TECHNOLOGY BANK
FOR LEAST DEVELOPED COUNTRIES

أكاديمية كاوست
KAUST ACADEMY

The Value Gap in AI Initiatives

The Core Challenge

Despite the hype, **85% of AI initiatives fail** to deliver measurable impact. Most projects stall as "science experiments" because they lack a structured path from raw data to bottom-line results.

The Solution

To succeed, organizations must move beyond implementation and master the **AI Value Chain**. This requires a deep understanding of:

- **Value Creation:** Identifying where intelligence solves high-stakes problems.
- **Value Flow:** Ensuring data and insights move seamlessly across the enterprise.
- **Value Capture:** Defining who owns the competitive advantage and the ROI.

What is the AI value Chain?

A framework that outlines the entire process of creating, deploying, and generating value from an artificial intelligence system, from initial data and infrastructure to the final application and its impact.

data (raw material) + AI (Factory) = Product (impact)

The AI Value Chain

Why do you think you should learn the AI value chain?

Apply AI to tackle local development **challenges**.

Build local AI skills and capacity for economic **growth**.

Enable data-driven policy and resource **optimization**.

Promote sustainable, context-specific AI **innovation**.

The Path to AI Value Realization

Strategic Alignment

Directing AI investment toward priority business or national outcomes.

Data Enablement

Ensuring trusted, scalable data to fuel AI at enterprise scale.

AI Development

Building AI solutions that address clearly defined, high-value problems.

Business Application

Converting AI capabilities into measurable operational and financial impact.

AI Foundations

Providing secure, resilient, and efficient platforms that underpin all AI activity.

Data

Data Strategy

Strategic Objective

Enable trusted, high-quality, and interoperable data as the backbone of AI

A strong data foundation is essential for scaling AI responsibly and effectively.

Defining a Data Strategy

Without a strong data strategy, AI adoption is slow, fragmented, and risky.

Governance & Security

- Protect & trust your data
- Ensure compliance & accountability

Interoperability

- Connect systems seamlessly
- Break silos, share insights

The Data Lifecycle

- Capture → Store → Process → Analyze → Archive
- Keep data clean, current, and ready for AI

جامعة الملك عبدالله
للعلوم والتقنية
King Abdullah University of
Science and Technology

Technology

UN TECHNOLOGY
UNITED NATIONS TECHNOLOGY BANK
FOR LEAST DEVELOPED COUNTRIES

أكاديمية كاوست
KAUST ACADEMY

Infrastructure

Data and AI Infrastructure comprises the fundamental systems to gather, store, process, and manage data. It is the factory, not the product

Cost-Effective AI Strategies

Cloud vs. On-Premise

Navigating the costs of global cloud providers (AWS, Google, Azure).

Regional Collaboration

The power of "Data Unions", sharing compute resources with neighboring nations to reduce costs.

Energy-Efficient AI

Prioritizing "Small Language Models" (SLMs) that require less power and data than massive LLMs.

Deployment Strategies: Cloud vs. On-Premise

Feature	Cloud Deployment (SaaS/PaaS)	On-Premise Deployment (Local)
Speed to Launch	**Immediate.** Get started in minutes.	**Slow.** Months for hardware & setup.
Cost Structure	**Pay-as-you-go.** (OpEx) No big checks.	**High Upfront.** (CapEx) Large investment.
Maintenance	**Zero.** Provider handles all updates.	**High.** Requires local expert IT staff.
Connectivity	**Required.** Needs stable high-speed internet.	**Offline.** Can work on local networks.
Data Sovereignty	Data sits on international servers.	Data sits on local servers.
Scalability	**Infinite.** Grow with a single click.	**Finite.** Limited by physical hardware.

Deployment Strategies: Decision Guide

Choose Cloud if:

You want to experiment quickly, have limited IT staff, or need to scale a service (like a national health app) to millions of citizens instantly.

Choose On-Premise if:

You are handling classified national security data, have very unreliable international internet, or have strict laws requiring data to physically stay within your borders.

The "Hybrid" Middle Ground:

Many leaders start with Cloud for prototyping and move critical data to local servers once the system is proven.

Open Source vs. Proprietary AI

Proprietary (Black Box):

- Training process is opaque
- May carry biases misaligned with local contexts
- Dependent on vendor roadmap

Open Source (Clear Box):

- Code and models are inspectable
- Can retrain on local languages
- Ensures accurate representation of citizens

Balancing Speed, Sovereignty, and Value

Hybrid Strategy

Use proprietary tools for rapid prototyping and quick ROI.

Sovereignty Strategy

Use open source for critical national infrastructure to avoid vendor lock-in.

Local Value Creation

Enable startups to build on open-source models, keeping innovation and economic benefits local.

Rule: Rent for convenience; own for critical infrastructure.

Aligning AI with Operational Control

Maturity Tier	Implementation Path	Core Competency	Primary Investment
SaaS (Software)	Out-of-the-box (e.g., ChatGPT)	Utilization: Prompting & Governance	Licensing (Per Seat)
PaaS (Platform)	API-driven (e.g., Claude API)	Integration: Python & App Dev	Consumption (Tokens)
IaaS (Infrastructure)	Bare Metal (e.g., AWS P5)	Deep Tech: CUDA & Kernel Ops	Hardware (Hourly GPU)

AI Deployment Models

1

Ready-to-Use Productivity (Buy)

Examples: Microsoft 365 Copilot or Google Workspace AI.

Best For: Enhancing daily workflows, rapid email writing, and baseline administrative efficiency.

Value: Instant deployment with zero technical overhead.

AI Deployment Models

1

Managed Platforms & Low-Code (Compose)

Examples: OpenAI Assistants API, AWS PartyRock, Zapier Central.

Best For: Creating bespoke internal agents and automating cross-app workflows without extensive engineering.

Value: Tailored functionality with minimal coding requirements.

AI Deployment Models

1

Specialized Enterprise Frameworks (Build)

Examples: LangChain/LlamaIndex for RAG, Databricks.

Best For: Developing sophisticated applications that require secure, real-time access to proprietary company data.

Value: High accuracy through Retrieval-Augmented Generation (RAG).

AI Deployment Models

1

Custom Model Development (Fine-Tune)

Examples: Training SLMs (Phi, Llama-3) via Azure ML, Google Vertex AI, or AWS SageMaker.

Best For: Mission-critical tasks in specialized domains (Legal, Medical, Engineering) where generic models fail to capture industry nuance.

Value: Maximum control and domain-specific intelligence.

AI Strategy Comparison: Speed vs. Control

Strategy	Tier	Time to Market	Total Cost	Skill Level	Data Privacy
Buy	Productivity	Days	Low	End-User	Standard
Compose	Managed	Weeks	Moderate	Citizen Dev	Good
Build	Frameworks	Months	High	Data/AI Engineer	Enterprise
Fine-Tune	Custom	6+ Months	Very High	Data/AI Engineer	Absolute

جامعة الملك عبدالله
للعلوم والتقنية
King Abdullah University of
Science and Technology

People

UN TECHNOLOGY
UNITED NATIONS TECHNOLOGY BANK
FOR LEAST DEVELOPED COUNTRIES

أكاديمية كاوست
KAUST ACADEMY

Bridging the Talent Gap

A Three-Pillar Strategy

Internal Reskilling

Targeted learning programs

Technology as the Teacher

Reduce dependency on specialized IT skills with low-code/no-code

Strategic Partnerships & Shared Resources

Leverage external expertise and best practices

Bridging the Talent Gap Strategy

Internal Reskilling: The "Skills-First" Approach

Instead of looking for AI experts, focus on upskilling your existing subject matter experts (SMEs) in agriculture, health, or finance.

- **AI Literacy for All**

  Ensure every employee understands what AI can (and cannot) do.

- **Prompt Engineering**

  Teach staff how to use AI to automate their daily workflows.

- **Micro-credentials**

  Support short, targeted certifications (e.g., from Google, Coursera, or local tech hubs) rather than waiting for 4-year degrees.

Bridging the Talent Gap Strategy

Technology as the Teacher: Low-Code & No-Code

Modern AI platforms allows leaders to leapfrog the coding requirement.

- ### No-Code Platforms

  Use visual tools to build AI models without writing a single line of code.

- ### Pre-trained Models

  Use "off-the-shelf" AI (like GPT-4 or Claude) that is already trained, requiring only local data to be useful.

- ### AI-Assisted Development

  Use AI (like GitHub Copilot) to help your junior IT staff write senior-level code.

Bridging the Talent Gap Strategy

Strategic Partnerships & Shared Resources

Collaboration is the ultimate multiplier for LDCs.

- ### Public-Private-Academic (PPA) Loops

  Partner with local universities to create "internship-to-hire" pipelines.

- ### Regional AI Hubs

  Share specialized talent (like Data Scientists) with other organizations or neighboring countries.

- ### Open Source Communities

  Leverage global projects (like Masakhane for African languages) to access high-quality, free AI resources.

> **Leader's Insight:** "In an LDC, you don't need a thousand engineers. You need ten 'Productivity Champions' who know how to use AI to empower the thousand workers you already have."

Governance

Why Governance Matters in AI

Ensure Accountability

Clear rules and oversight prevent misuse and build trust.

Protect Citizens

Safeguard data privacy, security, and rights.

Promote Transparency

Open processes reduce bias and build confidence.

Mitigate Risk

Strong governance limits ethical, legal, and reputational risks.

Pillars of AI Governance

Regulatory Frameworks

Laws and policies that guide ethical AI use.

Standards & Best Practices

Guidelines for data quality, interoperability, and fairness.

Oversight & Audit

Monitoring AI systems to ensure compliance and accountability.

Stakeholder Engagement

Include government, private sector, and civil society voices.

Data Sovereignty, Ethics, Privacy & Security

Data sovereignty means data must follow the laws of the country or region where it is collected or stored. Organizations are responsible for protecting that data, respecting privacy, and complying with local regulations.

Data Ethics

Managing data responsibly, guided by moral principles, not just legal rules.

Key Points:

Transparency & Consent

Be open and obtain permission for data use.

Purpose Limitation

Use data only for its intended purpose.

Accountability

Take responsibility for data handling and decisions.

Bias Prevention

Identify and reduce bias in data and algorithms.

Data Privacy

Protecting personal information and ensuring individuals control its use.

Key Principles:

User Control

Individuals decide how their data is used.

Data Minimization

Collect only what is necessary.

Security & Confidentiality

Keep personal information safe and private.

Data Security

Protecting information from unauthorized access, misuse, or loss using technical and organizational safeguards.

Key Measures:

Encryption

Secure data in transit and at rest.

Access Controls

Limit who can view or modify data.

Monitoring & Audits

Track activity and check compliance regularly.

جامعة الملك عبدالله
للعلوم والتقنية
King Abdullah University of
Science and Technology

Adoption

UN TECHNOLOGY
UNITED NATIONS TECHNOLOGY BANK
FOR LEAST DEVELOPED COUNTRIES

أكاديمية كاوست
KAUST ACADEMY

Building AI Readiness

Invest in Tech & People

Develop digital infrastructure and workforce skills together.

Build Human Capability

Strengthen leadership, digital literacy, and institutional capacity to adopt AI.

Strengthen Governance

Set standards for data quality, privacy, transparency, and accountability.

Promote Collaboration

Foster interdisciplinary research and partnerships for locally relevant AI solutions.

The Adoption Roadmap

Phase	Timeline	Focus Area	Key Milestones
Audit & Literacy	0-12 Months	Infrastructure	Audit existing data sets; launch foundational literacy programs.
Strategic Pilots	1-3 Years	High-Impact Sectors	Launch 2-3 pilots in Agriculture (yield prediction) or Health (diagnostics).
National Scaling	5+ Years	Systemic Change	Fully integrate AI into the National Education Curriculum and build regional hubs.

جامعة الملك عبدالله
للعلوم والتقنية
King Abdullah University of
Science and Technology

LDCs Adopting AI

UN TECHNOLOGY
UNITED NATIONS TECHNOLOGY BANK
FOR LEAST DEVELOPED COUNTRIES

أكاديمية كاوست
KAUST ACADEMY

How can LDCs build AI capacity without massive infrastructure investment?

Traditional Approach

Build everything yourself:

Data centers, broadband, universities, tech industry

It's called "traditional" because it follows the conventional wisdom of economic development: "Build everything yourself, own your infrastructure, develop domestic capacity."

The Traditional Path: Steps And Cost

Phase	Activities	Cost Range	Time Required
Phase 1: Physical Infrastructure	Data centers, broadband, power	$500M-5B	3-10 years
Phase 2: Human Capital	Universities, training, industry	$100M-1B	7-15 years
Phase 3: Technology Development	R&D, sovereign tech	$500M-5B	10-20 years
Phase 4: Deployment	National applications	$500M-5B	5-10 years
TOTAL	**All phases combined**	**$1.6B-16B**	**15-30 years**

جامعة الملك عبدالله
للعلوم والتقنية
King Abdullah University of
Science and Technology

Do you think this will work for LDCs?

UN TECHNOLOGY
UNITED NATIONS TECHNOLOGY BANK
FOR LEAST DEVELOPED COUNTRIES

أكاديمية كاوست
KAUST ACADEMY

Critical Bottlenecks and Constraints

Understanding the fundamental challenges across the AI value chain and their implications for development

Critical Bottlenecks and Constraints

AI Value Chain Layer

Hardware

Main Bottlenecks: High cost and reliance on limited suppliers (e.g., GPUs)

Implications: Requires large investment; increases global dependency for computing power

Data Management

Main Bottlenecks: Hard to scale data systems; inconsistent data quality and unclear ownership

Implications: Poor data leads to weak AI performance and security/privacy risks

Foundational AI Models

Main Bottlenecks: Needs huge data, compute, and talent; limited transparency ("black box")

Implications: Concentrates power among few players; hard to audit and ensure responsible AI

Advanced AI Capabilities

Main Bottlenecks: Models may inherit or amplify bias; users may misunderstand outputs

Implications: Strong governance needed for fairness, privacy, ethics, and explainability

AI Delivery & Adoption

Main Bottlenecks: Difficult "last-mile" integration into business workflows; skills gaps

Implications: Organizations must redesign processes and upskill workforce to adopt AI effectively

Constraint 1: The Energy Equation

- **The Reality:** AI demands uninterrupted power. A single data center facility in Lagos consumes **1MW daily** (equivalent to powering 750 homes).
- **The LDC Challenge:** In nations where 40-60% lack consistent electricity, data centers compete directly with rural electrification efforts.
- **Why This Matters:** You cannot build data centers if you can't guarantee 24/7 power. Frequent outages damage expensive equipment and corrupt data.
- **Implication for Strategy:** → Cloud partnerships eliminate this constraint (power is their problem, not yours)

Constraint 2: The Connectivity Divide

- **The Reality:** High-speed internet is urban-centric. Latency in rural zones makes "cloud-only" solutions unstable for agricultural or remote health tools.

The Numbers:

Urban internet: 50-100 Mbps, <50ms latency

Rural internet: 2-5 Mbps (when available), 300-500ms latency

Agricultural areas: Often no internet at all

Why This Matters: If your AI only works in cities, you're not helping the 60-70% of your population in rural areas.

Implication for Strategy: → Need hybrid approach: Cloud for training, edge devices for rural deployment → Mobile-first (SMS/USSD) for lowest-tech areas

Constraint 3: Human Capital Crisis

The Reality: Brain drain means local talent migrates to high-income countries. You face the risk of becoming a "technological colony" reliant entirely on foreign consultants.

The Numbers:

- **Average AI engineer salary in USA/Europe:** $120,000-180,000/year
- **Average government salary in LDCs:** $8,000-15,000/year
- **Salary gap:** 10-15x difference

Real Examples:

- **Rwanda:** Trained 50 AI developers (2020-2022), lost 12 to emigration (24% attrition)
- **Bangladesh:** University graduates in AI/ML, 40% leave within 3 years
- **Kenya:** iHub incubator trained hundreds, many now in Silicon Valley

Constraint 3: Human Capital Crisis

Why This Matters:

Even if you train people, keeping them is a different challenge. Foreign consultants cost 5-10x more than local staff.

Implication for Strategy:

- → Cascade training model (train 10, they train 100 - reduces single-person dependency)
- → Competitive retention packages (fast-track promotions, interesting projects)
- → Accept 20-30% attrition as unavoidable, plan for it

Constraint 4: Fiscal Space

The Reality: Severe budget limitations mean AI spending competes directly with water, sanitation, and primary education funding.

The Budget Competition:

Typical LDC Government Budget Priorities:

1. Healthcare: 15-20%
2. Education: 15-20%
3. Infrastructure: 10-15%
4. Defense/Security: 8-12%
5. Agriculture: 5-8%
6. Technology/Innovation: 1-3% (if that)

The Political Challenge: Minister of Finance asks: "Should we spend $500,000 on AI or build 10 new schools?"

Constraint 4: Fiscal Space

Real Example:

- **Malawi:** Proposed $2M AI initiative
- **Competing priority:** Clean water for 50,000 people (also $2M)
- **Result:** Water won (understandably)
- **AI project:** Delayed 2 years

The Hidden Costs: Even "free" cloud partnerships have costs:

- Staff training: $50K-100K
- Internet bandwidth: $20K-50K/year
- Maintenance staff: $40K-80K/year
- Total: $110K-230K/year (minimum)

Why This Matters: You must prove ROI quickly. Long-term investments (3-5 years payback) are politically difficult.

Implication for Strategy:

- → Start with smallest viable investment ($50K-100K, not $1M+)
- → Target quick wins (6-12 month results)
- → Show concrete savings/revenue (not abstract "innovation")
- → Use external funding where possible (development partners)

Why The Traditional Path Worked For Developed Countries

Abundant Capital:

Could invest billions without competing with basic services

Stable Power Grid:

24/7 electricity was already established

Educated Workforce:

Large pool of engineers and scientists

Established Universities:

MIT, Stanford, Oxford, Tokyo University

Time Luxury:

Could afford 20-30 year development timelines

Economic Buffer:

Could absorb failed experiments and pivots

Political Stability:

Long-term planning without disruption

Existing Tech Industry:

Companies like IBM, Microsoft, Google emerged domestically

Global Barriers

What Everyone Faces

Barrier 1 - The Supply Chain Stranglehold

Why Even Rich Countries Can't Build Their Own AI Hardware

The Three-Stage Bottleneck:

01

DESIGN (Who Invents the Chips)

- **Reality:** Only a handful of companies design AI chips
- **Market Control:** Nvidia controls 80% of AI chip design
- **What this means for LDCs:** You can't design your own—the expertise and R&D costs are too high ($2-5 billion per chip design)

02

FABRICATION (Who Makes the Chips)

- **Reality:** Only 2 companies can make advanced AI chips
- **Extreme Concentration:** TSMC (Taiwan) = 90% of advanced chips, Samsung = 10%
- **Single Point of Failure:** ASML (Netherlands) is the ONLY company that makes the machines needed to produce these chips
- **What this means for LDCs:** Even if you had $20 billion to build a factory, you couldn't buy the equipment

03

CLOUD/COMPUTE (Who Provides Access)

- **Reality:** Three companies dominate global cloud access
- **Market Share:** Amazon (32%), Microsoft (23%), Google (10%) = 65% total
- **What this means for LDCs:** Your only realistic option is to partner with these "hyperscalers"

Barrier 2 - The Technical Complexity

The Reality: AI infrastructure requires expertise in:

- Hardware engineering (chip design, networking)
- Software engineering (frameworks, optimization)
- Data engineering (pipelines, versioning)
- ML operations (monitoring, deployment)
- Security engineering (data protection)

The Expertise Gap:

- **Developed country:** 10,000+ AI engineers available
- **Typical LDC:** <50 AI engineers (often <10)
- **Gap:** 100-1000x difference

Why This Matters: Even if you had money for data centers, you don't have the people to run them.

The Catch-22:

- Need AI infrastructure → to attract AI talent
- Need AI talent → to build AI infrastructure
- (Chicken and egg problem)

Barrier 3 - The Speed of Change

The Problem: AI technology changes VERY rapidly. Infrastructure built today may be obsolete in 2-3 years.

Real Examples:

- **2018:** GPUs with 16GB memory considered cutting-edge
- **2024:** Need 80GB+ memory for modern AI models
- **Infrastructure lifespan:** 5-10 years expected
- **Actual useful life:** 2-3 years before obsolete

Barrier 3 - The Speed of Change

The Financial Risk:

Scenario: Build a $5M data center in 2024

- Year 1-2: State of the art, competitive
- Year 3-4: Adequate but not cutting-edge
- Year 5-6: Obsolete, can't run modern AI models
- Year 7-10: Still paying off the loan, but equipment is useless

Result: Lost $5M + opportunity cost

Cloud Advantage:

- Cloud providers upgrade hardware constantly
- You always have access to latest chips
- No obsolescence risk (their problem, not yours)

Implication:

- → Never build infrastructure that will be obsolete before it's paid off
- → Cloud partnerships transfer obsolescence risk to vendors

What do you think will work?

The Leapfrog Path

The Leapfrog Path: The Alternative

The leapfrog path is specifically designed to overcome LDC constraints by **skipping phases that don't work** and **jumping directly to what does**.

Leapfrog Path: Step-by-step

PHASE 1: Access Without Ownership (Months 1-3)

Step 1: Negotiate Cloud Partnerships

- Contact AWS, Microsoft Azure, Google Cloud
- Request government programs/credits
- Sign partnership agreements

$0-50K	2-8
Cost	Time
per year (credits often free)	weeks

Result: Immediate access to world-class infrastructure

PHASE 1: Access Without Ownership (Months 1-3)

What You Skip:

- Building data centers ($50M-500M)
- Buying servers ($10M-100M)
- Power infrastructure ($included in national grid)
- Cooling systems ($5M-20M)
- 24/7 maintenance staff (50-100 people)

What You Get:

- Same computing power as Fortune 500 companies
- Latest hardware (automatically upgraded)
- Global redundancy (no single point of failure)
- Expert support included

PHASE 2: Rapid Capacity Building (Months 2-6)

Step 2: Cascade Training Model

- Send 5-10 people for intensive AI training (abroad or online)
- They return and train 50-100 government staff
- Those 100 train their departments

$50K-100K	6-12	1,000+
Cost	Time	Result
total	months	people trained

PHASE 2: Rapid Capacity Building (Months 2-6)

What You Skip:

- Building universities ($50M-500M)
- PhD programs (7-10 years)
- Waiting for domestic expertise (15-20 years)

What You Get:

- Practical skills immediately
- Government staff who understand AI
- Distributed expertise (not dependent on 1-2 people)
- 30-60x cheaper than individual training

PHASE 3: Quick-Win Pilots (Months 3-12)

Step 3: Launch 2-3 Pilot Projects

- Choose high-impact, low-complexity use cases
- Use cloud infrastructure and trained staff
- Deploy in 3-6 months
- Measure results, prove value

$50K-200K

Cost

per pilot

3-12

Time

months to first results

Result: Visible impact, political support secured

PHASE 3: Quick-Win Pilots (Months 3-12)

What You Skip:

- Multi-year planning (3-5 years)
- Perfect policy first (2-3 years)
- Comprehensive infrastructure (5-10 years)

What You Get:

- Real results in <1 year
- Proof of concept for leadership
- Lessons learned for scaling
- Momentum and credibility

PHASE 4: Policy & Scale (Year 2-3)

Step 4: Develop Policy Based on Reality

- Write policy informed by what ACTUALLY worked in pilots
- Not theoretical framework, but practical guidance
- 20 pages, not 200 pages

$20K-50K

Cost

3-6

Time

months

Result: Actionable policy grounded in experience

PHASE 4: Policy & Scale (Year 2-3)

Step 5: Scale What Worked

- Expand successful pilots
- Add 5-10 more use cases
- Build permanent AI unit in government

$200K-1M

Cost

per year

Time: Ongoing

Result: National AI capability

PHASE 4: Policy & Scale (Year 2-3)

What You Skip:

- Perfect policy before pilots (2-3 years wasted)
- Scaling infrastructure you don't need yet
- Comprehensive strategy that doesn't match reality

What You Get:

- Policy that reflects actual experience
- Budget allocation based on proven ROI
- Gradual, sustainable growth

Traditional vs. Leapfrog Approach

Category	Developed Country Approach	LDC Leapfrog Approach
Power Supply	Reliable, virtually unlimited power	Unreliable, constrained power
Strategy	Build own data centers	Leverage cloud (outsource power & infrastructure)
Connectivity	Universal broadband	Urban-focused connectivity, patchy rural access
Architecture	Cloud-centric solutions	Hybrid: Cloud + Edge + Mobile devices
Talent	Large pool of AI engineers	Very limited AI talent
Skilling / Training	Hire from existing talent market	Cascade training programs

Traditional vs. Leapfrog Approach

Category	Developed Country Approach	LDC Leapfrog Approach
Investment	Large budgets ($100M+)	Modest budgets ($50K–$500K)
Timeline	Multi-year, strategic programs	Rapid, short-term wins to prove ROI quickly
Risk Tolerance	Can absorb failures, experiment widely	Must minimize failures; careful, stepwise approach
Execution Style	Broad experimentation	Start small, scale successful initiatives
Final Outcome	Build and own full infrastructure	Partner, adapt, and focus on high-impact solutions

Why Leapfrog Makes Sense:

Time is your enemy:

Technology changes too fast to wait 20 years

Money is scarce:

Can't compete with basic services for funding

Talent is mobile:

Brain drain means you can't build domestic capacity fast enough

Results matter:

Political pressure for quick wins

Learning by doing:

Real experience beats theoretical planning

The Mobile Phone Precedent:

LDCs already leapfrogged successfully with telecommunications:

Traditional Path (Developed Countries):

1. Build landline infrastructure (1880s-1950s)
2. Expand to universal coverage (1950s-1990s)
3. Add mobile as supplement (1990s-2000s)
4. Total: 100+ years, billions invested

Leapfrog Path (LDCs in 1990s-2000s):

1. Skip landlines entirely
2. Go straight to mobile towers
3. Achieve 70-90% coverage in 10-15 years
4. Total: 15 years, fraction of the cost

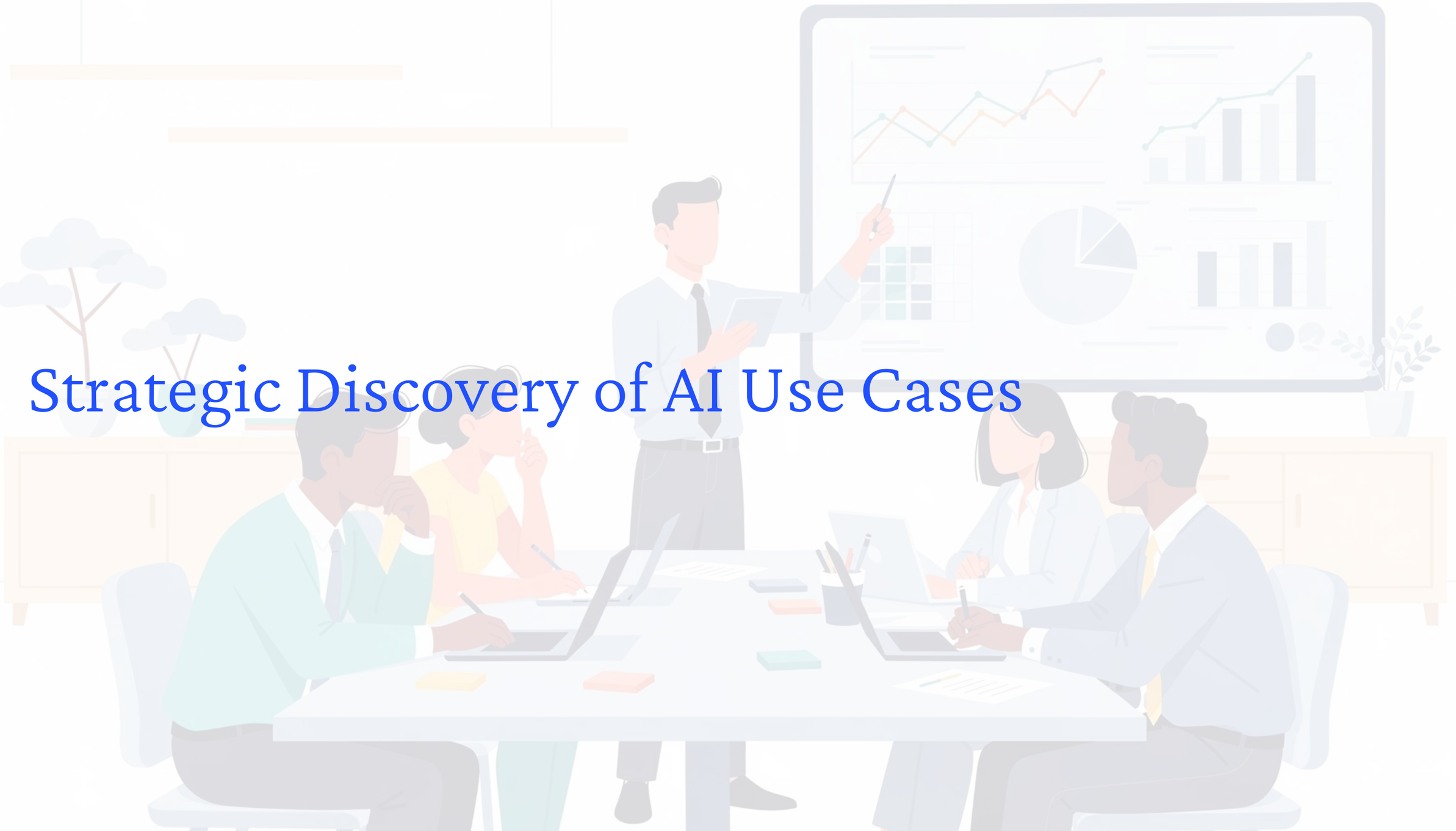
The Mobile Phone Precedent:

Result:

- Many LDCs have BETTER mobile coverage than developed countries
- Mobile money (M-Pesa) invented in Kenya, not Silicon Valley
- Leapfrogging works when you skip what doesn't fit your context

AI is the same opportunity: Skip data centers → Go straight to cloud Skip decades of infrastructure → Access it instantly through partnerships

Strategic Discovery of AI Use Cases



Evaluating AI Opportunities: Finding the Right Fit

- Identify potential AI use cases that align with your country goals and challenges.
- Conduct thorough business value assessments to prioritize projects based on potential impact, feasibility, and ROI.
- Consider factors like data availability, technical expertise, and regulatory compliance when evaluating options.

AI Implementation Roadmap

01

Define the specific scope, objectives, and desired outcomes of your AI project.

02

Assemble a cross-functional team with the necessary technical skills, business acumen, and project management expertise.

03

Select appropriate AI tools and technologies based on your project requirements, data landscape, and budget.

04

Establish a robust data infrastructure and governance framework to ensure data quality, security, and ethical use.

Strategic Discovery of AI Use Cases

AI & Data Capabilities

Business Intelligence (BI)

Insights from historical data; dashboards & reporting; supports decisions.

Analytical AI

Predicts trends; recognizes patterns; optimizes decisions.

Automation

Streamlines repetitive tasks; reduces errors; increases efficiency.

Generative AI

Creates content; boosts creativity; accelerates prototyping.

Strategic Discovery of AI Use Cases

Discovery Methods:

Value-Stream Mapping

Spot workflow bottlenecks in Finance, Legal, Ops, or Social Services caused by manual processes.

Voice of Citizens (VoC)

Analyze feedback, surveys, and complaints to reveal recurring service friction.

Comparative Benchmarking

Study AI adoption in peer governments to identify best practices (e.g., predictive maintenance, automated approvals).

Strategic Discovery of AI Use Cases

Defining Success (G.O.M. Profile)

Goal (Why):

National development priority or public value. *Example: Improve rural healthcare access.*

Objective (What):

Specific, measurable government action within a timeframe. *Example: Deploy mobile clinics to underserved communities in 12 months.*

Metric (How Much):

Quantifiable measure of impact or efficiency. *Example: 20% more rural clinic visits; 15% drop in maternal mortality.*

Success Story:

Rwanda as "Africa's AI Lab"

The National AI Strategy (2023–2030)

The 6 Strategic Pillars:

1

Skills & Literacy:

Reskilling the workforce and integrating AI into all levels of education.

2

Infrastructure:

Building reliable "AI-ready" cloud storage and high-performance compute capacity.

3

Data Strategy:

Creating open, secure, and trusted data ecosystems to fuel machine learning.

4

Public Sector:

Automating government services to improve efficiency and transparency.

5

Private Sector:

Incentivizing startups and SMEs to adopt AI through "innovation-friendly" procurement.

6

Ethical Guidelines:

Establishing the **Responsible AI Office** to ensure safety and privacy.

Healthcare: AI-Driven Diagnostics & Logistics

Horizon 1000 Project

A partnership with OpenAI and the Gates Foundation to provide AI "Co-pilots" for nurses in rural clinics.

Medical Scribes

Using AI to summarize patient histories, allowing doctors more face-time with patients.

Zipline Logistics

Autonomous drone delivery (optimized by AI) for blood and vaccines, reducing delivery times from hours to minutes.

Impact

Real-time disease surveillance and improved resource allocation in remote areas.

Education: The "Chidi" AI Companion

The Partnership

A landmark collaboration between the **Government of Rwanda, ALX, and Anthropic**.

What is "Chidi"?

An AI tutor built on the Claude model that uses the Socratic method (it asks questions to lead students to answers rather than just giving them).

Educator Support

2,000+ Rwandan teachers trained in "AI Career Essentials" to automate lesson planning.

Localized Context

Development of AI models that understand Kinyarwanda and local cultural nuances.

Agriculture: AI for Food Security

Predictive Analytics:

AI analyzes satellite and weather data to predict crop yields and pest outbreaks.

Geo-Hub Integration:

Farmers receive real-time, SMS-based advice on irrigation and planting dates based on their specific soil data.

Supply Chain Optimization:

AI-enabled logistics platforms reduce post-harvest waste by matching farmers directly with markets.

Economic Impact:

Target of **25% increase** in agricultural productivity by 2029.

Why Rwanda Succeeded

Regulation First:

Rwanda created the laws (Data Protection and AI Ethics) *before* the massive rollout, building public trust.

Partnership Focus:

They don't build alone; they partner with global leaders (Google, Microsoft, Anthropic, WEF) while maintaining local ownership.

Problem-First Approach:

They don't use AI because it's "cool"; they use it because they have a specific problem (e.g., a shortage of doctors or climate volatility).

Call to Action:

Rwanda is no longer just a consumer of AI; it is a global innovator for responsible AI.

The Leader's Mandate

The Leader's Mandate

Vision over Code:

Leaders don't need to code; they need to understand what the code can *do*.

Cultural Shift:

Promoting a "fail-fast, learn-fast" mindset within government and industry.

Call to Action:

Identify one specific "Domain" (e.g., Health Care) where AI can move the needle this year.

The Leader's Mandate

The impact of AI is not determined by the code, but by the leadership decisions behind its implementation.

AI for Different Economic Sectors

Economic Sectors

- Agriculture
- Energy and utilities
- Healthcare
- Public administration and governance
- Tourism and hospitality
- Education
- Financial services
- Manufacturing
- Telecommunications and ICT
- Transportation and logistics

Agriculture

Strategic Focus

Productivity, climate resilience, food security

Priority AI Uses

- Precision farming and yield prediction
- Pest and disease detection
- Climate and weather risk modeling
- Smart pricing and supply-chain forecasting

Enablers: IoT, satellite data, farmer-centric mobile platforms

Education

Strategic Focus

Personalized learning and equitable access

Priority AI Uses

- Adaptive learning platforms
- AI tutors and teaching assistants
- Automated assessment and feedback
- Dropout and performance risk analytics

Enablers: Digital curricula, teacher AI literacy, data protection

Energy and Utilities

Strategic Focus

Reliability, efficiency, and decarbonization

Priority AI Uses

- Demand and load forecasting
- Predictive maintenance of assets
- Renewable energy output forecasting
- Smart grids and dynamic pricing

Enablers: Real-time sensors, edge AI, cybersecurity

Financial Services

Strategic Focus

Inclusion, trust, and risk management

Priority AI Uses

- Fraud detection and AML
- Credit scoring with alternative data
- Personalized financial advice
- AI-powered customer support

Enablers: Explainable AI, regulatory compliance, data governance

Healthcare

Strategic Focus

Better outcomes, efficiency, and access

Priority AI Uses

- Medical imaging and diagnostics
- Clinical decision support
- Predictive population health
- Hospital operations optimization

Enablers: Interoperable EHRs, clinical validation, privacy

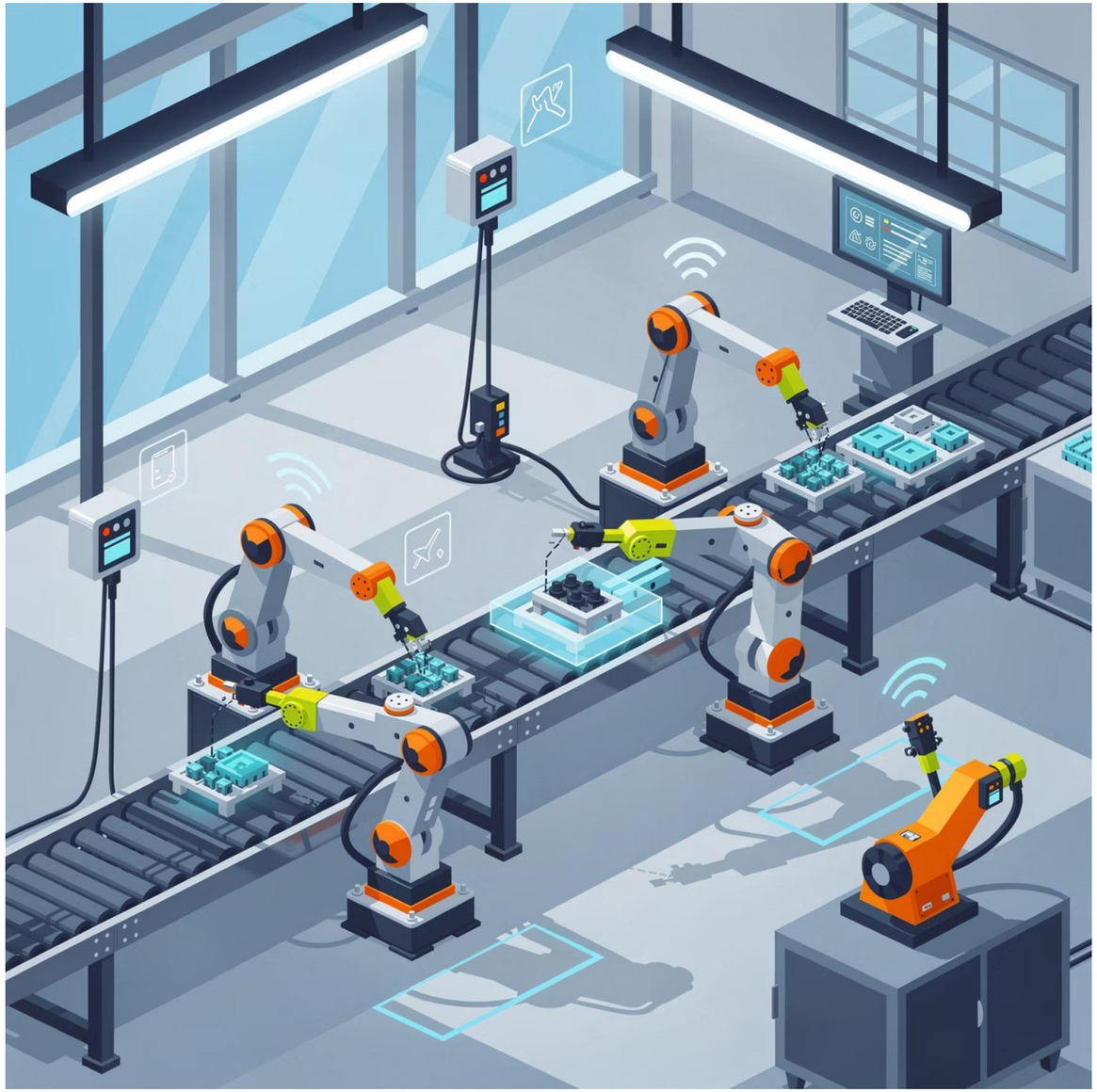
Manufacturing

Strategic Focus

Smart factories and operational excellence

Priority AI Uses

- Predictive maintenance
- Computer vision quality inspection
- Process optimization and digital twins
- Collaborative robotics



Enablers: Industrial IoT, workforce reskilling, edge computing

Public Administration

Strategic Focus

Efficiency, transparency, and trust

Priority AI Uses

- AI-driven citizen services
- Policy modeling and impact analysis
- Fraud, waste, and leakage detection
- Smart urban planning

Enablers: Ethical AI frameworks, human-in-the-loop oversight

Telecommunications

Strategic Focus

Resilient, intelligent digital infrastructure

Priority AI Uses

- Network traffic optimization
- Predictive fault detection
- AI-based customer experience
- Spectrum and capacity management

Enablers: AI-native networks, edge/cloud integration

Tourism and Hospitality

Strategic Focus

Personalization and sustainable growth

Priority AI Uses

- Personalized travel recommendations
- Dynamic pricing and demand forecasting
- Virtual concierges and assistants
- Crowd and sustainability management

Enablers: Integrated tourism data, multilingual AI

Transportation and Logistics

Strategic Focus

Efficiency, safety, and resilience

Priority AI Uses

- Route and fleet optimization
- Predictive maintenance
- Autonomous and assisted driving
- Supply-chain demand forecasting

Enablers: GPS/IoT data, vehicle telematics, logistics platforms, advanced sensor technology

جامعة الملك عبدالله للعلوم والتقنية
King Abdullah University of Science and Technology

Thank You!

UN TECHNOLOGY
UNITED NATIONS TECHNOLOGY BANK FOR LEAST DEVELOPED COUNTRIES

أكاديمية كاوست
KAUST ACADEMY